

METAL PRODUCTS MANUFACTURING

M P M

*Serving the Appliance and
Fabricated Metal Products Industry*

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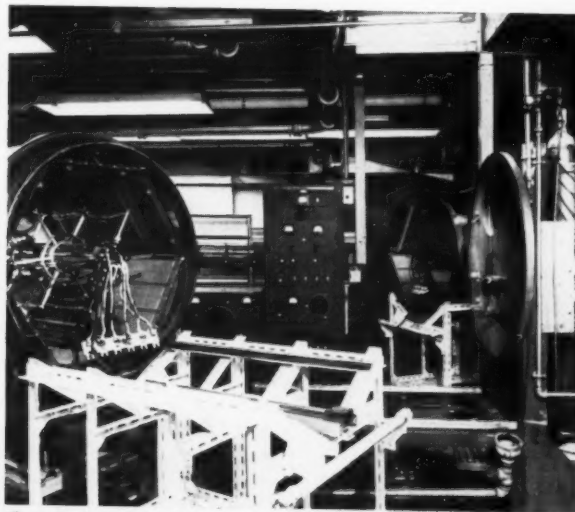
APRIL 1961



New Royal McBee Plant Meets Unique Production Problems — Page 38



Forming Vinyl-Clad Steel for Kitchen Cabinets — Page 54



Electroluminescent Lighting Moves Ahead — Page 46

TLC* dryer control thinks for itself

... all she does is set the dryness she wants!

**Robertshaw TLC* dryer control
does for the laundry
what automatic cooking
has done for the kitchen!**

Robertshaw's TLC* dryer control automatically determines evaporation taking place by measuring temperature drop of air passing through wet clothes ... calculates with extreme accuracy the amount of drying required for any size load, any fabric, any mix. Temperature is gradually reduced as clothes approach desired dryness. When set dryness is reached, heat is turned off for gentle fan-cooling.

Results: *tender, loving care* for even the daintiest things, because:

- TLC eliminates drying time guessing ... *there is no timer*
- TLC dries everything from single handkerchief to full load
- TLC drying temperatures safe for all fabrics ... any mix
- TLC prevents over-drying ... and reduces tumbling wear
- TLC delivers cool, dry clothes ... wrinkling reduced
- TLC is as simple to operate as your range oven control

In short ... TLC dries clothes safely ... in the least amount of time ... economically ... automatically ... *and without a timer* ... not even a hidden one! Specify Robertshaw TLC control on your 1962 dryers.

VMA7788



... the name that MEANS temperature control

ROBERTSHAW THERMOSTAT DIVISION

Robertshaw-Fulton Controls Company
Youngwood, Pennsylvania

Canadian Affiliate

Robertshaw-Fulton Controls Company, Limited, Toronto

*Trade Mark — Robertshaw TIMER-less control system for any dryer
(available on 1962 dryers)



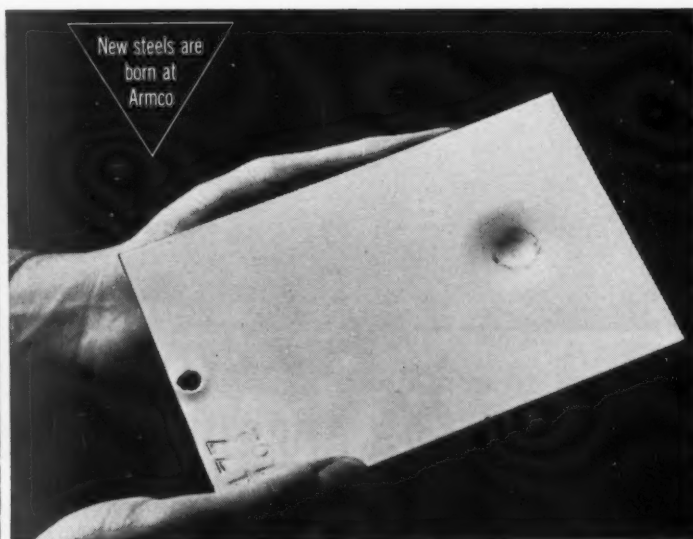
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More than a half-century of intensive research has gone into the development and improvement of Armco's special base metals for porcelain enameling. Armco Enameling Iron, for standard two-coat applications, has long been known as the "world's standard." Now Armco UNIVIT® is available for direct-on application of finish coats.

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- ☐ Bulletin "How to get the most out of Paint Strippers"
- ☐ Details on Kerns Memo Billing Trial Basis
- ☐ Have representative call for further discussion

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MPM

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MONTHLY TRADE PUBLICATION

Established January 1944

Published by

DANA CHASE PUBLICATIONS, INC.

York Street at Park Avenue, Elmhurst, Illinois
Telephone • TErrace 4-5280 • TErrace 4-5281



APRIL • 1961

VOL. 18 • NO. 4

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METAL PRODUCTS MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

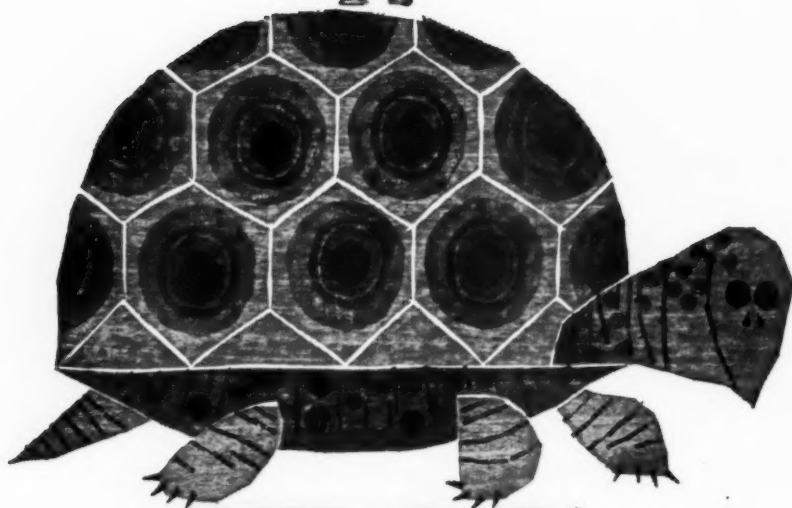
A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. The editorial scope covers design, engineering, market and statistical information and technical and practical information on plant facilities and all phases of manufacturing "from raw metal to finished product." Free controlled circulation to top management, sales management, purchasing, engineering and key plant management and supervision in metal product manufacturing plants. To others, subscription price is \$8.00 per year, domestic. To all other countries \$10.00 per year (U.S. funds). Single copies, \$1.00.

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PRINTED IN U.S.A.

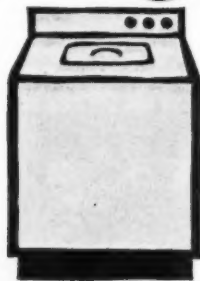
Accepted as a controlled
circulation publication
at Aurora, Illinois.

Editor and Publisher • DANA CHASE
Associate Editor • WM. N. LARSEN
Associate Editor • RAY SCHUSTER
Publisher's Assistant • DOROTHEA C. MEEKER
Circulation Manager • KATHRYN BANCROFT
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FUNCTIONAL or DECORATIVE ...

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AN ALERT MANAGEMENT . . . and a versatile organization are required to meet today's problems relating to the manufacture and distribution of appliances and other fabricated metal products. While building and selling the products which must bring in the bread and butter (and a profit), there are always the engineering and merchandising problems resulting from "jet age" developments, either from within or from outside the industry.

HOME LAUNDRY

Coin-Ops . . . are currently getting the attention of the home laundry industry, but for the time being, at least, the home laundry units must pay the research bill. While a stable merchandising program should "come out in the wash" — or "in the cleaning" — it will apparently be some time before there will be stabilization of the type of equipment that will get the nod (small units, large automatic units, building packages, etc.) and what the predominant outlet for this equipment will be (independent businesses or existing dry cleaning and laundry establishments).

REFRIGERATION

Accelerated Freeze-Drying . . . should be getting the attention of all the planning departments in the refrigeration industry. Thousands of people who have a vivid memory of "dried eggs" and other dehydrated foods from the war years will take a dim view of anything that seems similar. On the other hand, the fact that some of the largest food processors in this country and organizations in Europe are putting money into plant facilities for "quick freeze-drying" would indicate the possibility that storing a steak on an unrefrigerated kitchen shelf may be closer than we think.

If 500 pounds of food with a normal high water content can be shipped and stored in the space normally required for 100 pounds of the same product, the obvious commercial advantages are sure to push this development forward.

While accelerated freeze-drying is not likely to revolutionize the home refrigerator business over night, this long-range possibility calls for alertness on the part of the refrigerator manufacturer—and the kitchen cabinet manufacturer.

THERMOELECTRICITY

Thermoelectric Power . . . for use in connection with gas heating equipment that will require no electric power for circulation fans has been described earlier in MPM. A number of companies in the space heating field are working with this development. For the most part, estimates on the arrival date of a commercially practical unit for household use have placed the time at from three to five years or more. A current report from one manufacturer (*see page 32, March MPM*) indicates that such a unit will be available for sale by late 1962.

Here again, it isn't expected that production lines on conventional units now in use will be stopped because of this new development; on the other hand, if it does prove to be practical, it could be significant to a number of facets of the appliance industry.

These three brief examples of current developments point up the fact that today's successful manufacturer of appliances or similar fabricated metal products is and must continue to be very much "awake at the switch" whether it is in relation to a pushbutton dry cleaner, a steak that stores without refrigeration, or a heating plant with a "motorless" fan. Such developments are no longer proceeding at a snail's pace. Another point — today's bread-and-butter products must bring in the profit to finance tomorrow's developments.

Dana Chase

EDITOR AND PUBLISHER

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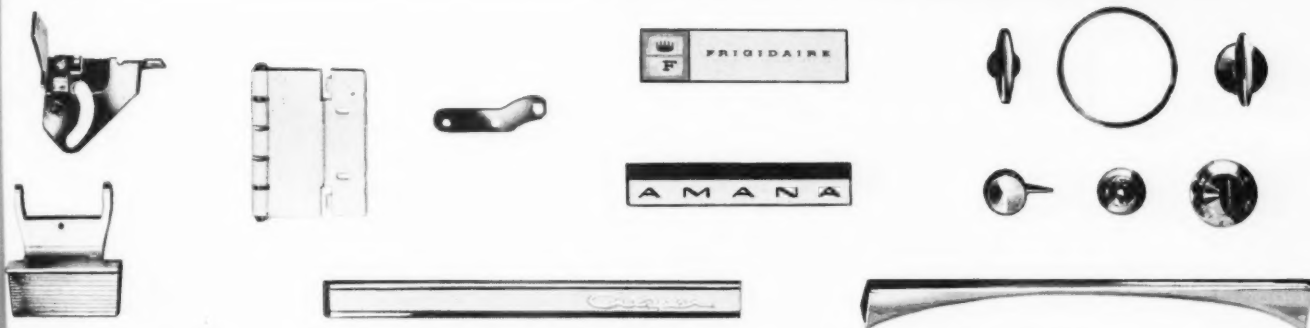
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"VALUE-PLUS"

When your products require hardware to make them look better, last longer, or function better . . . you are entitled to extra service and value. This is our business . . . producing hardware with "VALUE-PLUS" features that put extra sales-appeal into your products. Illustrated here are a few of the many products manufactured by Amerock for firms in diversified industries.

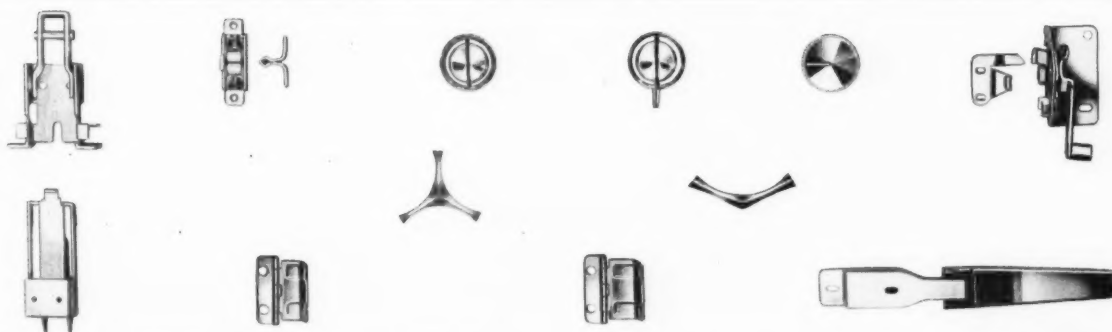


RANGES AND REFRIGERATORS

Amana Refrigeration, Inc.
Athens Stove Works, Inc.
Crown Stove Works
Cribben and Sexton Company
Franklin Mfg. Co.
Frigidaire Division, General Motors Corp.

Hardwick
Hotpoint Co.
Norge Division, Borg-Warner Corp.
Philco Corp.
Preway Corp.
Geo. D. Roper Corp.

Sub-Zero Freezer Company, Inc.
The Sunray Stove Co.
The Tappan Company
Westinghouse Electric Corporation
Whirlpool Corp.



DISHWASHERS, WASHERS, AND DRYERS

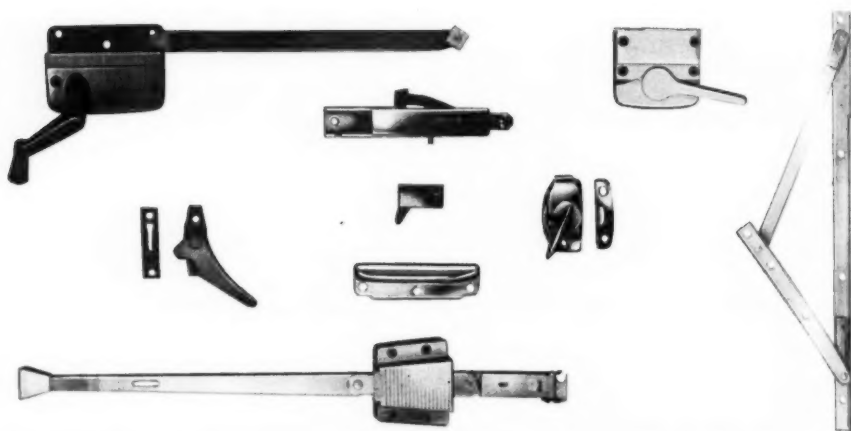
Blackstone Corporation
East Laundry Appliance Division,
Murray Corporation
Frigidaire Division, General Motors
Corporation

General Electric
Hamilton Manufacturing Company
Design and Manufacturing Corporation
Hotpoint Company
Lovell Manufacturing Company

The Maytag Company
Norge Division, Borg-Warner Corporation
Speed Queen, Division of McGraw-Edison
Company
Waste King Corporation

WINDOWS

Andersen Corp.
V. E. Anderson Mfg. Co., Inc.
CARADCO, Inc.
Curtis Companies, Incorporated
Farley & Loetscher Mfg. Co.
Fraleigh Inc.
The Harvey Company
Morgan Company
Rock Island Millwork Co.
Rolscreen Co.
Malta Mfg. Co.
Migneault et Fils
Newton Lumber Co.
Semling—Menke Co. Inc.
Wisconsin Window Unit Co.



RADIO, T. V. AND RECORD PLAYERS

Admiral Corp.
General Electric Co.
Magnavox Company
Motorola Inc.
Philco Corp.
Radio Corporation of America
Warwick Mfg. Co.
Zenith Radio Corp.



OTHER DIVERSIFIED PRODUCTS

Bell and Howell Co. (Projectors)
Big Boy Mfg. Co. (Outdoor Cooking Equipment)
The Brearley Co. (Bathroom Scales)
Kewaunee Technical Furniture Co. (Institutional Equipment)

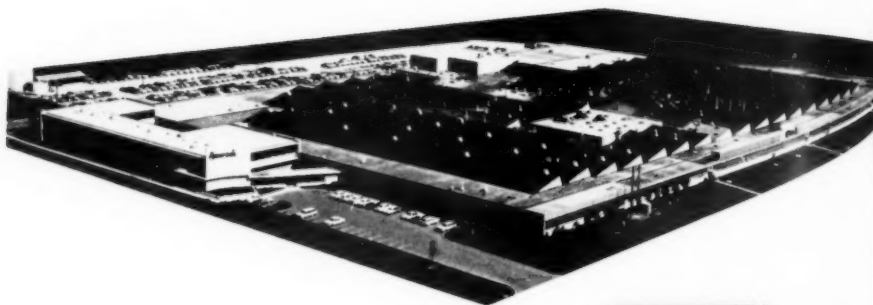
The F. H. Lawson Co. (Bathroom Cabinets)
Lennox Industries, Inc. (Furnaces)
Lyon Metal Products (Lockers)
E. H. Sheldon & Co. (Institutional Equipment)
Republic Steel Corp.—Berger Division (Lockers)

Storkline Furniture Co. (Sewing Machine Cabinets)
Sunbeam Corp. (Small Appliances)
The Vendo Corp. (Vending Machines)
Whirlpool Corp. (Vacuum Cleaners)

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MPM

industry meetings

NATIONAL

GAS RESEARCH & UTILIZATION

American Gas Association's Research and Utilization Conference, Cleveland, Ohio, April 4-6, 1961.

ARCHITECTURAL METAL

The 23rd Annual Convention of the National Association of Architectural Metal Manufacturers, Plaza Hotel, New York City, April 9-15, 1961.

PACKAGING

The American Management Association's 30th National Packaging Exposition, McCormick Place (Lake Front Exposition Center), Chicago, Ill., April 10-13, 1961.

GAS APPLIANCES

The Gas Appliance Manufacturers' Association's Annual Meeting, Boca Raton Hotel and Club, Boca Raton, Fla., April 13-15, 1961.

HOME LAUNDRY

The American Home Laundry Manufacturers' Association's 1961 Convention, Boca Raton Hotel and Club, Boca Raton, Fla., April 16-18, 1961.

WELDING EXPOSITION

The American Welding Society's Annual Welding Exposition, Coliseum, New York, April 18-20, 1961.

NEMA CONSUMER PRODUCTS

National Electrical Manufacturers' Association's Consumer Products Division Meeting, Boca Raton, Fla., April 20-22, 1961.

METALS ENGINEERING

The 1961 Metals Engineering Conference, Sponsored by the Metals Engineering Division of The American Society of Mechanical Engineers, Penn-Sheraton Hotel, Pittsburgh, Pa., April 23-25, 1961.

CERAMICS

The American Ceramic Society's 63rd Annual Meeting, Royal York Hotel, Toronto, Ontario, Canada, April 23-27, 1961.

APPLIANCES

Appliance Technical Conference, Kentucky Hotel, Louisville, Ky., May 1-3, 1961.

LEAD INDUSTRY

The 33rd Annual Meeting of the Lead Industries Association, Drake Hotel, Chicago, Ill., May 2-3, 1961.

CASTINGS

The American Foundrymen's Society's Castings Congress and Exposition, Brooks Hall, San Francisco, Calif., May 8-12, 1961.

DESIGN ENGINEERING

Design Engineering Show, Cobo Hall, Detroit, Mich., May 22-25, 1961.

SECTIONAL

GAS APPLIANCES

The Gas Appliance Engineers' Society (Midwest Chapter) Meeting, Mickleberry Restaurant, Route 30, Chicago Heights, Ill., May 10, 1961.

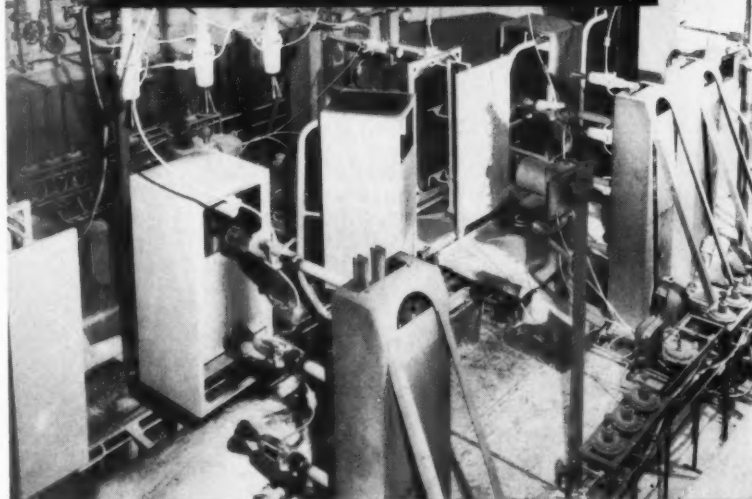
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NEW

RANSBURG

MOVING BELLS

increase paint mileage
... improve quality on
KELVINATOR REFRIGERATORS



Ransburg's No. 2 Process moving bells—latest innovation in electrostatic painting—automatically paint mixed sizes of refrigerator cabinets and doors on Kelvinator's new finishing line.

On this job—first of its kind—limit switches re-position the reciprocating bells to accommodate various model sizes mixed on the same line. And, electric eyes selectively trigger the paint on and off between parts.

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Like Kelvinator, other manufacturers of quality products will find Ransburg's moving bells the automation answer for production lines where batching of similar parts is impractical.

NO REASON WHY YOU CAN'T DO IT, TOO!

Want to know how Ransburg No. 2 Process can improve the quality of YOUR painted products—and at the same time—cut YOUR paint and labor costs? Write for our No. 2 Process brochure. Or, if your production doesn't justify automatic painting, let us tell you about the No. 2

Process Electrostatic Hand Gun which can be used in either conveyORIZED, or non-conveyORIZED painting.



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job-matched

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under-paint
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... for better rust prevention
... for better paint bonding

Lock paint on...lock corrosion out: ALL Oakite Cryskoat processes do both by converting a steel surface into an integral "toothed" layer of rugged phosphate crystals. Yet they're different enough to let you *job-match* a pre-paint treatment to the product service conditions and to your production setup—for lowest unit costs.

There's a spray-wash or tank immersion phosphate treatment for saving on heating costs... for easy control... for faster production... for smoother paint films... for heavy duty protection. Pick the ONE that's right for you.

Oakite CRYSCOAT 47: heavy, fast-coating iron phosphate. Iron phosphating at its best. Cleans off average fabricating oils and soils as it phosphates; produces a premium quality coating. Increases corrosion resistance. Conserves spray washer time. Bulletin F-10058C.

Oakite CRYSCOAT 87: smooth, paint-saving iron phosphate. Spray setup uses only 3 stages. Saves time, equipment; easy to control. Doubles the 250 hour specified minimum of salt spray resistance. Bulletin F-10300.

Oakite CRYSCOAT 187: NEW—iron phosphate treatment. Specifically designed for application by tank immersion. Provides new detergent and solvent action to assure greater cleaning efficiency... more thorough removal of smut from steel. Has built-in pH control. Offers longer solution life.

Longer-lasting: These two panels were identically painted; scored with an "X" and exposed to salt spray test for 480 hours. The big difference: right-hand panel was first treated with an Oakite Cryskoat iron phosphate coating.

Better-looking: This tubing was Cryskoated, painted, and then subjected to repeated punching. Despite the severe abuse, paint film still grips tight—still looks good.

Oakite CRYSCOAT 89: economical, iron phosphate. Works in spray washing machine without foaming. Easy to control, requires no stainless steel equipment. Bulletin F-10301.

Oakite CRYSCOAT HC: heavy duty zinc phosphate. For tank application. Creates a heavy zinc phosphate coating for severe service conditions. Exceeds the 150 milligram per square foot requirement; up to 1200 milligrams obtainable. Bulletin F-10305.

Oakite CRYSCOAT SW—single package zinc phosphate. No outside accelerators needed. Easy to control. For spray washer or tank application. Coatings meet Government specification MIL-C-490A Grades I and III. Offers long solution life. Bulletin F-10309.

Oakite CRYSCOAT MP—heat-saving zinc phosphate. Produces zinc phosphate coating at low temperature, on steel cadmium and zinc. Keeps sludging to a minimum. For spray washer or tanks. Bulletin F-10768.

Oakite CRYSCOAT FG—smooth, dense zinc phosphate. Develops a fine grain zinc phosphate coating. Spray washer or tank immersion. Low to moderate temperature process. Promotes a smooth paint finish. Bulletin F-10767.

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OAKITE

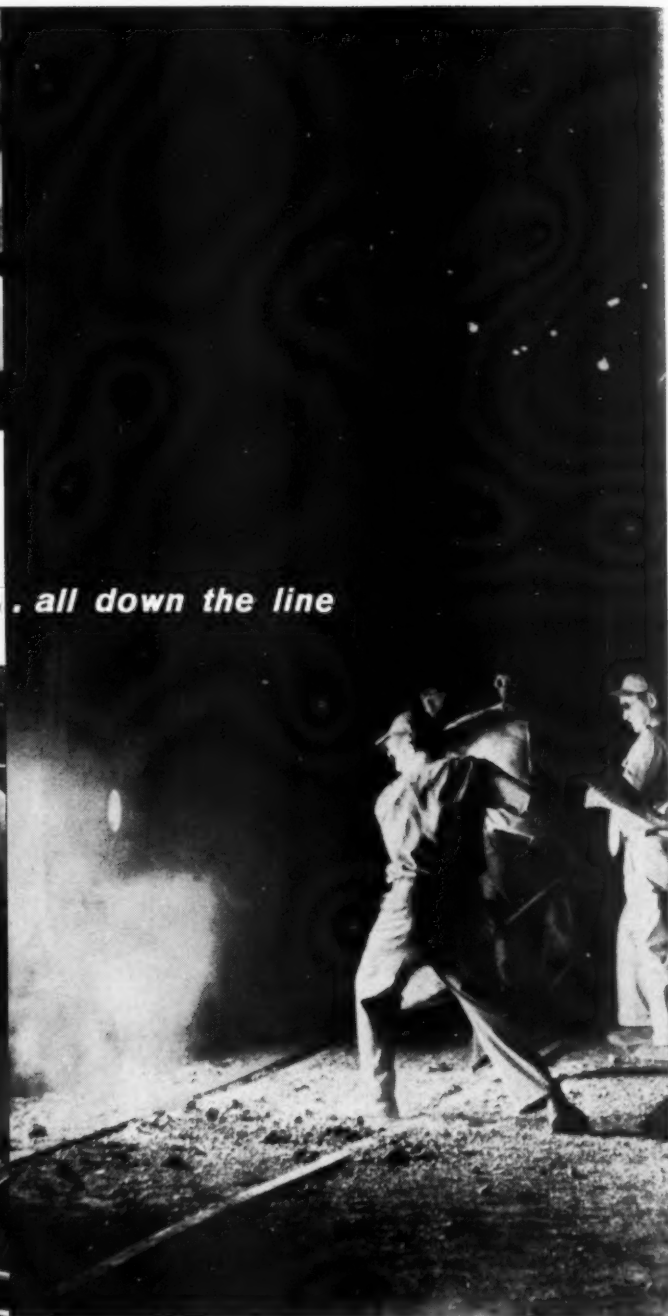
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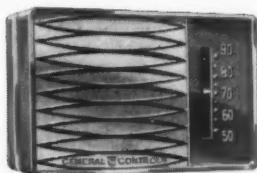
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IT'S A NEW IDEA

IN A NEW SHAPE...

WITH A SHEER LOOK...

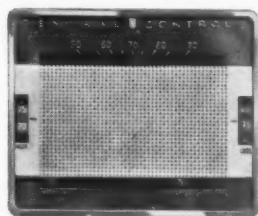
AND LOTS OF USER APPEAL...



HEATING OR COOLING T-99 Room Thermostat with mercury switch dependability and "subtle touch" styling.



HEATING AND COOLING T-91 one dial summer-winter mercury switch air conditioning Room Thermostat with both heat and cold anticipation and "subtle touch" styling.



HEATING AND COOLING, AUTOMATIC SWITCHOVER T-344 Master Control Center with built-in heating-cooling interlock, heat and cold anticipation, mercury switches, and "subtle touch" styling.

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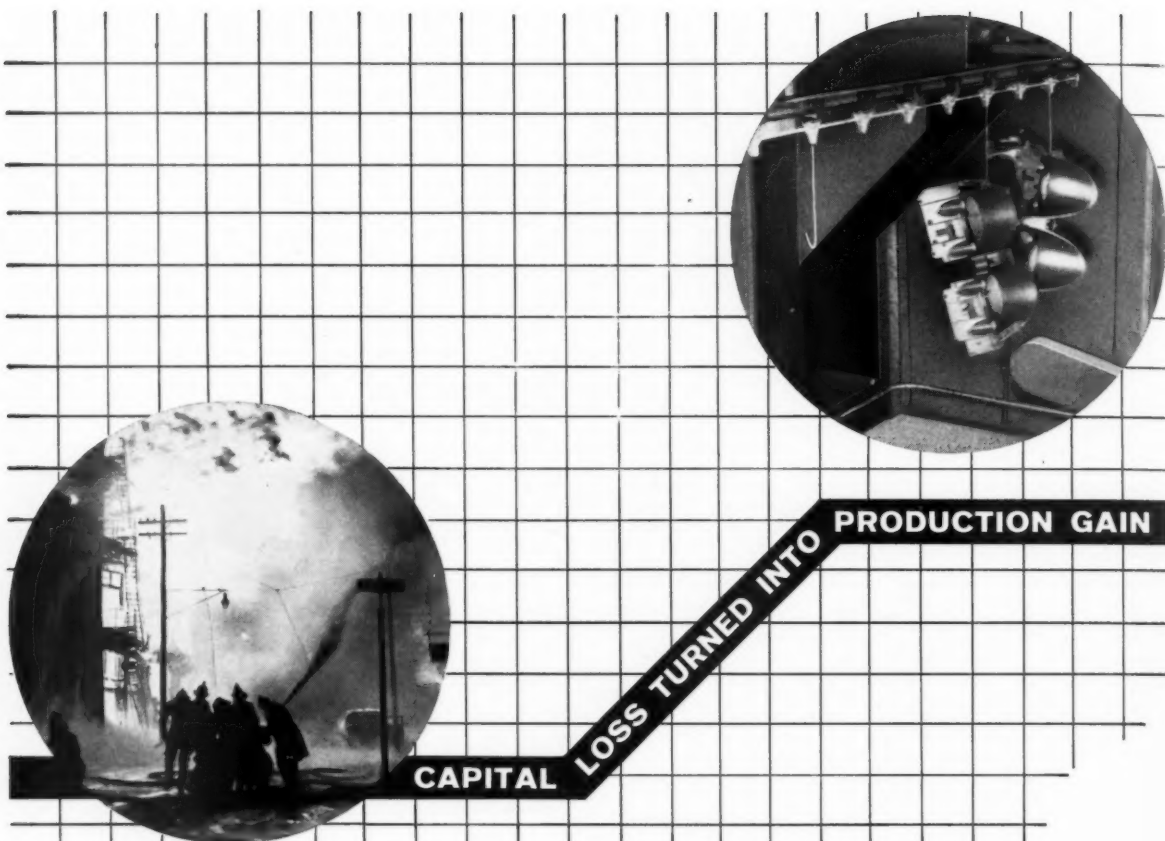


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GEN 1-2

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from plant ruins to production records in sixty days

One of the toughest rebuilding problems confronting the Clements Mfg. Co. when their Deckerville, Mich., plant was completely demolished by fire, was speedy replacement of the finishing system needed for phosphate coating and painting of its diversified line of automotive diecast and sheetmetal parts.

The new system had to be versatile—had to handle many different sizes and shapes. It had to be inexpensive to operate fuel-wise and labor-wise. Above all, it had to be delivered and installed in a matter of a few days—it had to do a high quality job right from the start—and it had to take up little floor space.

Experienced MOCO design and process engineers rose to the challenge.

First, a 3 stage washing machine for phosphating and rinsing was designed and built at the MOCO plant, and shipped completely finished, except for piping hook-up, directly to the Clements Mfg. Co. plant.

Next, MOCO engineers tackled the drying and paint baking problem. A combination Dry-off and Bake Oven was developed that could dry parts as they came from the washing machine on their way to the spray booths, and bake the painted parts as the conveyor returned them to the oven for a longer period before delivery to the conveyor unloading station.

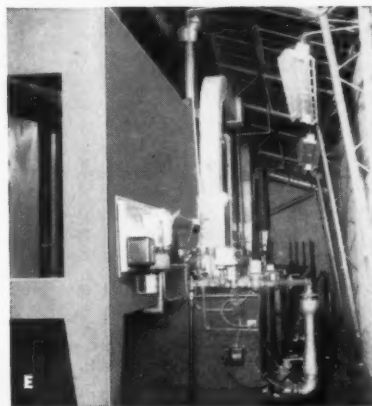
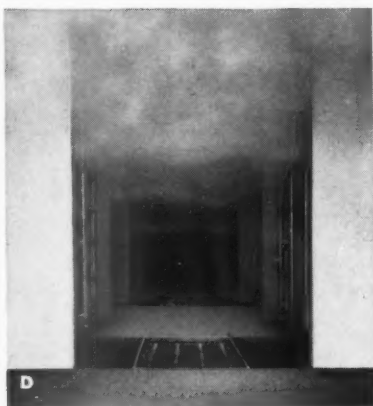
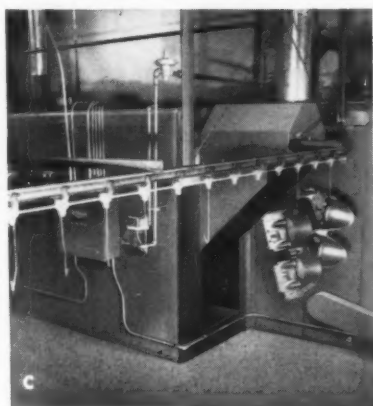
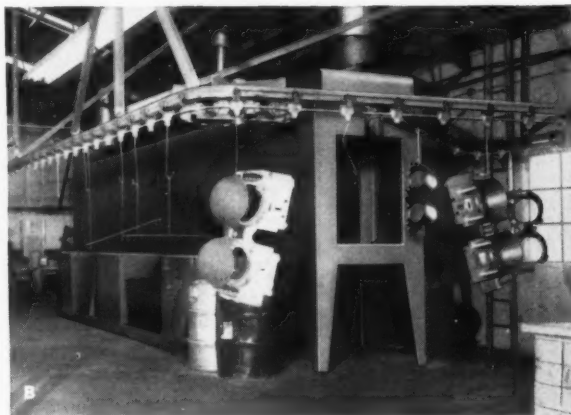
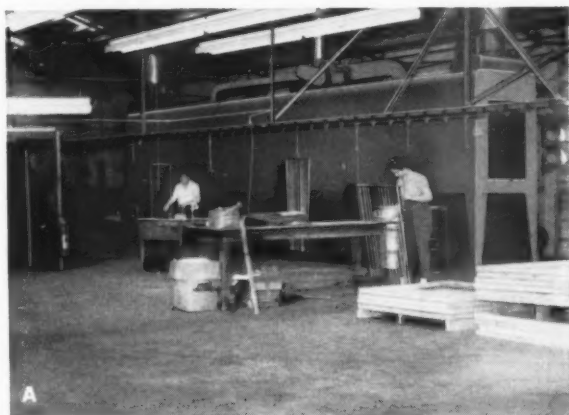
The Dry-off and Bake Oven was too large to ship already assembled, but MOCO's unitized design made assembly at the Clements Mfg. Co. plant a relatively simple matter.

Within 60 days of the disaster, the Clements Manufacturing Company plant was back in full operation with production at a higher level than ever before, thanks to MOCO ingenuity, engineering skill and desire to

serve its customers. MOCO problem-solvers will welcome the opportunity to serve you.

Write for the name of our representative nearest you.

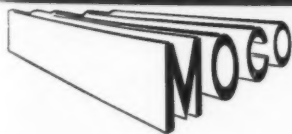
FREE—Send for your MOCO bulletin showing typical finishing system applications and specifications; no cost or obligation, of course.



A—Sixty days after the Clements Mfg. Co. plant was burned to the ground this finishing system was in operation in the rebuilt plant. In the right foreground workers are loading and unloading parts. Behind them is the MOCO Washing Machine. On the left, paint spray booths hide the MOCO combination dry-off and paint baking oven. B—Start of the completely conveyorized finishing cycle. From loading station at left parts enter MOCO 3 stage washing machine for washing,

rinsing and phosphate coating. C—Finishing parts coming out of combination dry-off and bake oven on their way to unloading station. D—Entrance view of phosphating machine indicating risers, nozzles, street elts, drain decks, access walkways, spray zone silhouettes shown immediately after pump stopped. E—3 stage MOCO washing machine showing tanks, fill and overflow pipes and valves, pumps, burners, controls and exhaust ducts.

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newsquotes

As long as you [dry cleaners] provide costly services like marking, sorting, spotting, finishing, bagging, storage and delivery, you are not in a position to undersell the [coin-operated] machine which provides only cleaning.—William L. Browne, National Institute of Dry Cleaning.

Computers have a definite and invaluable place in the processing picture, but the results secured will largely be determined by the total system equipments. The computer itself is no stronger than the weakest equipment link in the system chain.—Ray R. Eppert, Burroughs Corp.

The engineer's dream—the compact, all-white kitchen which looked terribly efficient (even if it wasn't) has lost its appeal with the modern homemaker. Now she yearns for, and is getting, a kitchen with decorative charm—often with extra space for family meals and informal entertaining. Fireplaces and rocking chairs are not unheard of in kitchen planning circles.—Margaret Hutchinson, Martin-Senour Paint Co.

Without a basic price, an industry becomes a ship without a rudder and it is doomed to flounder on the shoals of a barren economy.—K. W. Burge, from a letter to The Chicago Daily News.

It seems to be the popular belief that once a man sets up his stall in the marketplace, it is the duty of society to maintain him in that stall, regardless of his service, and to protect him from those who perform his job more efficiently and at less cost to those who come to buy.—Beryl Manischewitz, The B. Manischewitz Co.

When OEM goes to the stylist to get an aesthetic improvement, the stylist sometimes unwittingly produces a very beautiful design that is completely incompatible with the mechanism that is designed to go with it.—Anonymous

An expanded range of unit capacities and a major absorption design breakthrough are expected to nearly quadruple the gas industry's air conditioning market eligibility during the next year.—W. G. Wepfer, Arkla Air Conditioning Corp.

MPM APRIL • 1961



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06

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Reader Service

KEYKOTE 25 COATING

Bulletin 12A, published by Kelite Corp., details Keykote 25, a metal preparation coating. According to the bulletin, Keykote 25 solutions operate in a low pH range (2.7 to 4.0) in one to six-stage spray washers, immersion or steam phosphatizing methods. The material is a powdered phosphate composition embodying iron for ductility, zinc for galvanic protection, manganese for hardness, and ferromolybdate for passivity.

Circle No. 101 on Reader Service Card.

DEGREASING BULLETIN

A four-page, illustrated bulletin describing vapor-spray-vapor degreasers has been announced by the Phillips Mfg. Co. Principle of operation, solvent cycle and a table of specifications on all vapor-spray-vapor models are discussed and illustrated.

Circle No. 102 on Reader Service Card.

NACREOUS PIGMENT HANDBOOK

A revised edition of the eight-page Nacreous Pigment Handbook has been announced by The Mearl Corp. New material covering Murano Colors, Mearl's synthetic pearl essence in color, and Mearlite, a non-lead pearl pigment is included in the new edition.

As in the original version, introductory material describing natural and synthetic pearl pigments, is followed by discussions of the important factors such as dispersion and orientation of pearl crystals, choice of pigment types, formulations for various applications, and application procedures.

Circle No. 103 on Reader Service Card.

SILICONE INFORMATION

A new booklet on silicones containing the most recent advanced information on these man-made chemicals has just been issued by the Silicones Div. of Union Carbide Corp. as an aid to engineers and technical personnel.

Illustrated with photographs, charts and graphs, the booklet goes into detail about what silicones are, describes their manifold uses for consumer and industrial products, and suggests ways in which they can be adapted to a host of new applications by the design engineer or product development manager.

Circle No. 104 on Reader Service Card.

WELDING STAINLESS STEEL

Information concerning techniques for welding stainless steel is contained in The Lincoln Electric Co.'s new bulletin, "Arc Welding Stainless Steel." The bulletin gives physical properties, structure, and welding characteristics of the different types of stainless steel. It also has a chart listing deposit properties, and electrode recommendation tables for the different types.

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NEW DESIGNS IN ELECTRIC MOTORS

New designs in small, low-cost electric motors for appliances, pumps, vending ma-

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Any other comment? _____

chines and other motorized applications are highlighted in a new brochure just issued by Brevet Products Corp.

Complete specification data is given for the new Series M shaded-pole induction motors, and models in helical, spur and worm gearmotors. Descriptions include speed ranges, torques, size, gear descriptions, and optional features such as brake, clutch and socket output shaft. Drawings of each series show all important shaft, mounting and outline dimensions.

Circle No. 106 on Reader Service Card.

POLYFAX COATINGS

Uses, application methods and advantages of the Polyfax finishing system are presented in a booklet available from Inter-

chemical Corp. Polyfax is a three-step offset gravure finishing system consisting of ground coat, a printing ink, and a clear, protective topcoat. In addition to detailing possible uses of the various patterns available, production techniques are explained and illustrated.

Circle No. 107 on Reader Service Card.

KNUCKLE JOINT PRESSES

A line of knuckle joint presses is described in a catalog recently published by Cleveland Punch & Shear Works, Inc. Covered are presses ranging in capacity from 150 to 3000 tons with bed areas from 18 by 18 inches to 50 by 54 inches.

Circle No. 108 on Reader Service Card.

INDUSTRIAL COUNTING INSTRUMENTS

Catalog 200, published by Durant Mfg. Co., presents a full description of industrial counters. The catalog presents all models needed to meet ordinary industrial requirements. The models are listed according to actuating methods — stroke, revolution, electric and predetermined, and lineal counters. A price list is also included.

Circle No. 109 on Reader Service Card.

MOTORIZED COIL LIFTERS

Motorized Cullen-Friestedt coil lifters with motorized swivels are detailed in a new bulletin. The equipment allows the crane operator to grab, lift, carry and rotate, set down and release the load precisely, without additional help.

Circle No. 110 on Reader Service Card.

STANDARDS AND DEFINITIONS

A new 54-page catalog listing official United States Government specifications for a wide variety of adhesives, coatings and sealers is now available from the Adhesives, Coatings & Sealers Div., Minnesota Mining & Mfg. Co.

The catalog lists, in numerical form, military specifications, specification definitions, intended application, and the corresponding 3M adhesive, coating or sealer that meets these specifications.

Circle No. 111 on Reader Service Card.

LITHOGRAPHY SERVICE

A four-page brochure describing the expanded industrial lithography service and facilities of the Electric Autolite Co. is now available. The brochure includes descriptions and samples of panels, dials, escutcheons and instruction plates done in a variety of available finishes.

Circle No. 112 on Reader Service Card.

AIR-POWERED GRINDERS

The Rotor Tool Co. has announced the publication of new literature describing air-powered straight grinders. The six-page bulletin contains complete specifications for the standard four-inch and light-duty six-inch grinders and buffers, the standard six-inch and light-duty eight-inch grinders and buffers and the series of heavy-duty eight-inch grinders and buffers equipped with internal blade motors.

Circle No. 113 on Reader Service Card.

AUTOMATIC IMPULSE COUNTER

Bulletin No. N-310, by Automatic Timing & Controls, Inc., describing the new Series 310 automatic reset impulse counter, is now available. Included is data on construction, application, installation, specialized functions, electrical data and basic circuit arrangements.

Circle No. 114 on Reader Service Card.

HANDLING STRIP STEEL COILS

A four-page bulletin released by Dixon Automatic Tool, Inc., describes the company's coil grabs and coil hooks. The bulletin gives complete specifications and has a number of action photos showing safety features and how the equipment is used.

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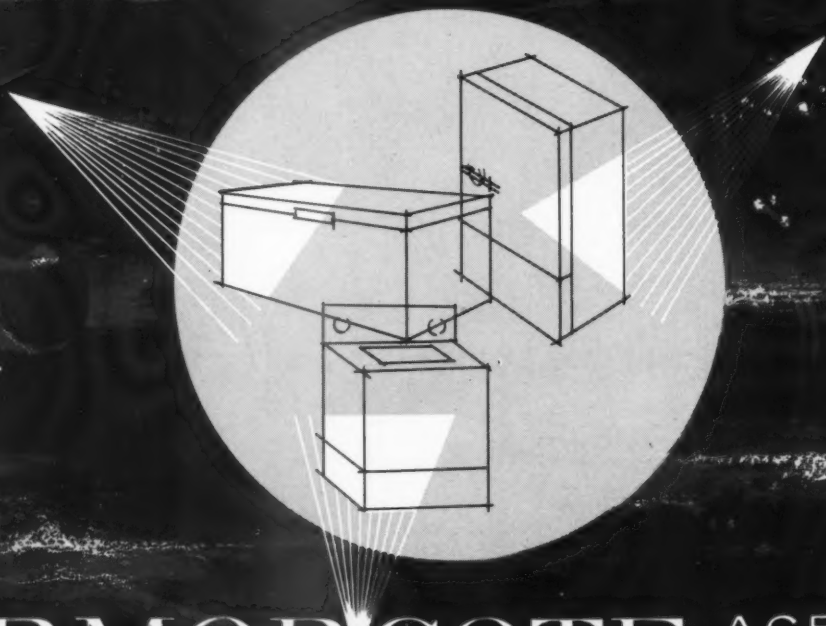
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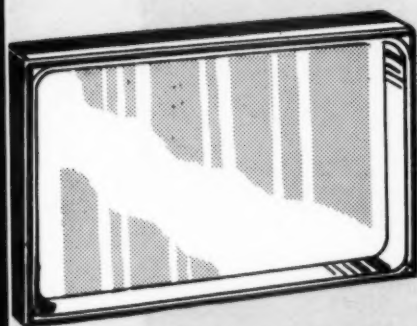
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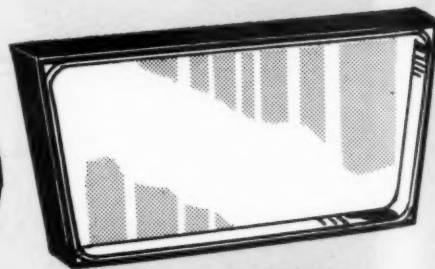
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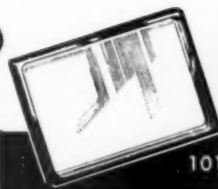
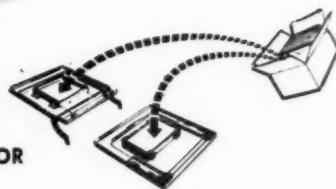
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Barbara Schurgin named 1961 Mrs. Home Laundry Queen

BARBARA PRICE SCHURGIN of Detroit has been selected winner of MPM's annual Mrs. Home Laundry Queen contest.

Blonde Barbara takes over the Queen's throne for 1961 from Virginia Haberman, who was sponsored by Speed Queen in last year's competition.

Entered by the Kelvinator Div., American Motors Corp., Barbara has been awarded a matched Kelvinator automatic washer and dryer — a fitting prize for

ago, Barbara attended a Paris finishing school when she was 17, and later modeled fashions in Paris and Rome. In 1954 she was named Australia's "Model of the Year."

In her home town she met her American husband, Arthur Schurgin, who was booking musical shows from the United States to Australia and European countries. They were married in 1955 and have been around the world with son Bill three times.



Barbara Price Schurgin — MPM's 1961 Mrs. Home Laundry Queen.



In addition to her professional modeling career, Barbara's domestic responsibilities include husband Arthur and son Bill.

a queen with a husband and a four-year-old son.

This marks the fifth consecutive year MPM has conducted the Queen competition as a tie-in with the national AHLMA meeting. This year's meeting will be held April 16-18 at the Boca Raton Hotel and Club, Boca Raton, Fla.

The Queen was chosen from a group of entries whose pictures were submitted by manufacturers for publication in the special Home Laundry section of the September 1960 issue.

Born in Brisbane, Australia 26 years

Homer L. Travis, Kelvinator vice president, sales, presents bouquet to Queen Barbara. In the background is matched Kelvinator automatic washer and dryer presented to the Queen by MPM.



STANDARDIZATION IN APPLIANCE CONTROLS

Part I — Lack of Standardization is Costly

BY *R. L. Heckman* • MANAGER — PRODUCT PLANNING,
GENERAL ELECTRIC CO., MORRISON, ILL.

IF YOU EXAMINE the history of major appliances it is apparent that there have been many appliance changes resulting in many innovations, new products and new features, but there has been relatively little alteration in the functional characteristics of controls.

It would seem logical to expect that, under these circumstances, appliance controls would exhibit a high degree of standardization. However, they do not. My purpose here is to examine some of the reasons for this lack of standardization and to indicate some of the consequences in extra costs to the industry.

The lack of standardization in appliance controls may be traced to the frequency of redesign of many of the control items. Hardly a year goes by that at least one of the appliance components is not redesigned. Why should this be if its basic function is not changing?

An examination of the reasons for control redesigns over the years yields the following partial list:

1. To achieve more application flexibility.
 - a. Smaller size
 - b. Mounting
 - c. Appearance
 - d. Knob attachment
 - e. Terminals
 - f. Additional circuitry
2. To achieve lower costs.
3. To achieve higher reliability.

As a great number of control redesigns have been directed toward obtaining flexibility to handle the multiplicity of applications required, let's examine this area in more depth. By discovering spe-

cific causes for the many past redesigns, we can determine possible standardization areas for the future.

An example of a redesign for appearance is a range oven timer. While this product has a certain amount of inherent flexibility to handle changing customer requirements, it is very difficult to change the distance between the setting shafts. Changing this dimension may require all of the following:

1. New dies for front and back plate
2. Redesign of gear train
3. New gear tools
4. New sub-assembly fixtures and tools
5. New line assembly fixtures
6. New test and check fixtures
7. New cartons

Thus a redesign which offhand appears quite simple, in that it does not change the function of the timer, can cost the industry a lot of money.

Another area which constantly harasses control designers is knob fastenings. Many controls contain a cam or other highly functional part on the other end of the shaft on which the knob fits. Changing the knob fastener also changes a highly functional part. And yet there are about as many types of knob attachment schemes as there are appliances. There are great standardization opportunities in this area.

Still another example is in the wiring terminal area. The control terminal is often a highly functional part, in addition to being a terminal. Yet, many controls are furnished with two or three types of terminals. This causes double or triple tooling of major functional ele-

ments, and leads occasionally to complete redesigns in order to obtain the necessary flexibility.

Frequent control redesigns cost money. Even many of the redesigns originally undertaken to achieve lower product costs lose money in the long range. Perhaps few of us realize the amount of money involved in the control area where the product may be no larger than a package of cigarettes. Direct tooling costs and direct service costs can reach staggering proportions compared to the direct product cost.

Direct tooling costs involved in changing range oven timer designs in our department have exceeded \$1 million in the past ten years. Pro-rating this cost over the production volume yields over 20 cents per unit for every unit built.

Direct service costs caused by component redesigns are illustrated in the accompanying chart, which represents a plot of a typical field return curve for a complex appliance component. This merely spells out graphically that the longer a complex component is manufactured, the better will be its reliability. We are concerned here with an average condition, not with the exceptions which occasionally plague the industry.

Shown in conjunction with the chart is a calculation of service costs, factoring in only charges for service calls and an amount to cover replacement parts. It does not cover indirect expenses such as inventory expense, servicemen training, etc. Even when only the direct costs of service are considered, it can be seen that a product which lasts five years in

READER QUOTES

"The simplicity of a range itself, consisting of a heating unit and a steel ornamental body and controls, may have been a reason for component and controls producers bearing the brunt of model changes year after year."

"The advantage of standardization can be represented in a stack of gears which has lived a year or more and been 'de-bugged' so that the result is a good stack of gears. Along comes September and a new style is requested, which may require throwing away the proven gear stack for something new in an appearance change. The result is a new stack of gears which must again be de-bugged over another period of one or two years."

PAST TRENDS IN MAJOR APPLIANCE CONTROLS

Major Appliance	Yrs. on Mkt.	Control	Original Control	Added Since Original	Basic Function Changes
Refrigerators & Freezers	38	Cold Control	x		2
		Starting Relay	x		
		Motor Protector	x		
		Butter Thermo.		x	
		Defrost Control		x	
Room Air Conditioners	22	Starting Relay	x		
		Motor Protector	x		
		Cold Control		x	
		Frost Control		x	
		Staging Control		x	
Electric Ranges	39	Oven Thermo.	x		1
		Timer	x		
		Top Burner Contr.		x	
		Infinite Surface Contr.		x	
		Meat Probe		x	
Automatic Washers	12	Sequence Timer	x		1
		Water Level Switch	x		
		Water Valve	x		
		Solenoid	x		
		Motor Protector	x		
Electric Dryers	12	Sequence Timer	x		
		Thermostat	x		
		Overheat Thermo.	x		
		Motor Protector	x		
		Sequence Timer	x		
Dishwashers	35	Water Valve	x		
		Solenoid	x		
		Motor Protector	x		
		Starting Relay		x	
		Starting Relay	x		
Food Waste Disposers	20	Motor Protector	x		
		Flow Interlock	x		
	178		23	9	4

EDITOR'S CAPTION: Of the total number of years that the listed major appliances have been on the market (178), there have been nine control functions added and four basic functional changes made in controls. This amounts to one control addition for each 19 years

of major appliance history and one basic function change for each 44 years of appliance history. From a functional standpoint, therefore, it would appear that the appliance industry is not the aggressive, progressive giant that we commonly picture it.

design life saves \$500,000 per year over a product which is redesigned each year. On the assumed annual volume of 1,000,000 units, that's 50 cents each.

These illustrations serve to focus at-

tention on the need for long range thinking as far as costs are concerned. In the appliance control business, we've found it helpful to think in terms of the total costs involved in a ten-year period rather

than just considering today's product costs. It is remarkable how much guidance this simple change in outlook can bring to bear on a given situation.

There are great opportunities in the

READER QUOTES

"Not only do component changes often compound manufacturing costs, but they go all along the line in manufacturing and service requirements within the manufacturing company, including service manuals, the training of servicemen, etc."

"An important point is the weakness in liaison between the stylist, the engineering group at the OEM plants, and the designing staff at the component manufacturer. In the final analysis, the latter must produce the parts to answer the requirements of the first two."

These reader quotes are presented anonymously because specific permission to quote was not requested.

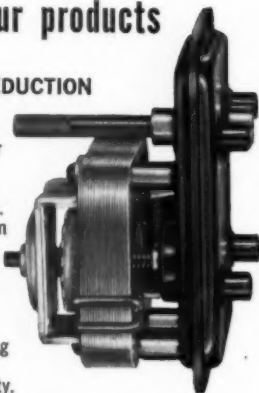
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extremely
quiet running
plus rugged
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GENERAL SPECIFICATIONS

MODEL 205		
	Intermittent	Continuous
SPEED	13 RPM	13 RPM
TORQUE	150 in./oz.	100 in./oz.
AMPS, No Load	2.5	1.25
WATTS, No Load	26	13
REVERSIBLE	No	No
CONDENSER	None	None

MODEL 308		
	Intermittent	Continuous
SPEED	13 RPM	13 RPM
TORQUE	200 in./oz.	75 in./oz.
AMPS, No Load	1.2	0.4
WATTS, No Load	25	7
REVERSIBLE	Yes	Yes
CONDENSER	60 MFD	25 MFD

Above data based on 24 volts—Intermittent Duty 3 minutes on and 5 off. Both models can also be supplied for 115 volts—60 cycles.

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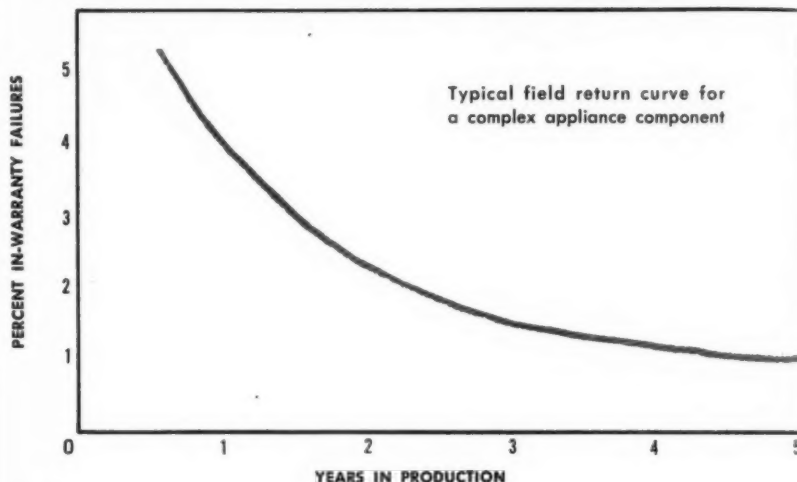
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appliance control area for eliminating the extra costs incurred by non-standardization. By proper planning and anticipation of customer needs we the suppliers should be able to offer our major

appliance customers an even wider variety of controls to meet their needs, while at the same time reaping for the industry the benefits of standardized components and sub-assemblies.

DIRECT SERVICE COSTS CAUSED BY COMPONENT DESIGN CHANGES



Notes:

1. In-warranty failures based on warranty of 12 months. Includes failures only. Does not include service calls for instruction, etc.
2. Curve applies to a given design in production 5 years. In-warranty failures plotted for "0.5 years" are average percentage of all production during the first year, etc.

CALCULATION OF SERVICE COST

	1 design/yr.	1 design/2 yrs.	1 design/5 yrs.
Annual Production — units	1,000,000	1,000,000	1,000,000
Avg. % Failures From Curve	5.0	3.5	1.7
Service Cost/Failure*	15.00	15.00	15.00
Total In-warranty Service Cost	\$ 750,000	\$ 525,000	\$ 255,000

*Includes \$10.00/service call, \$5.00 to cover cost and shipping of replacement part.

Next Month: PART II . . . The Modular Approach

In the May issue of MPM, Mr. Heckman will describe one approach which can provide a reasonable degree of standardization within a line of products, while at the same time retaining sufficient flexibility to take care of changing customer requirements. The article will discuss how a component manufacturer can help himself and his customers solve the problems outlined in Part I.

EDITOR'S NOTE:

RELIABILITY . . . is a term that we will be hearing a great deal more about in the months and years to come throughout the appliance and fabricated metal products industry. In fact, much of the future of the appliance industry, as far as the consuming public is concerned, could hinge on this word.

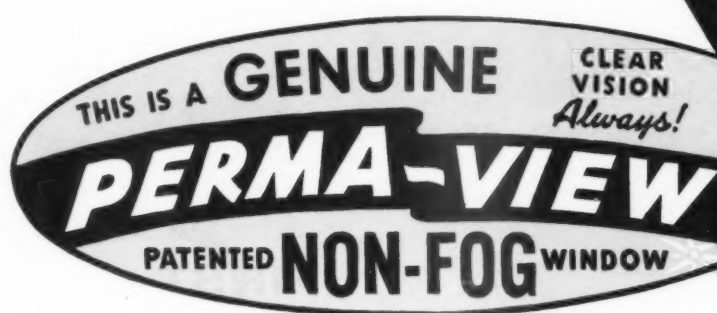
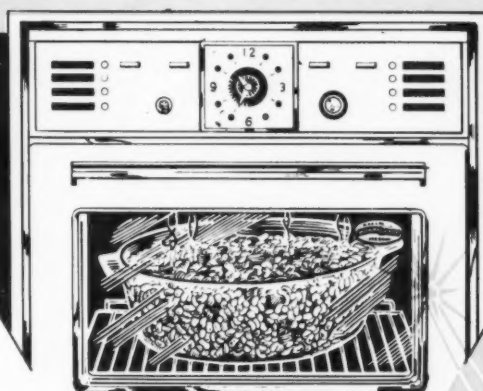
In April 1960, MPM carried a guest editorial by Marvin A. Fuller, staff engineer, Whirlpool, on this subject. We note a presentation, "Component Reliability," by R. L. Heckman of General Electric appears on the program of the Appliance Technical Conference scheduled for May 1-3.

We note too that reliability will be the subject of two papers at the annual AHLMA meeting in Florida, April 16-18. Dr. Franklin H. Wells, AMP, Inc., and Dr. Friedrich W. Schwarz, Controls Co. of America, will discuss "Reliability—Now," and "Reliability—Future," respectively.

It is just one word in the English language—reliability—but our prophecy is that it will become an increasingly important one to the readers of MPM.

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Whirlpool's new Mark 36 gas range is designed to fit snugly between kitchen cabinets. The unit measures 25 inches from front to back and is 36 inches high — the same measurements as the standard kitchen countertops.

Interchangeability, performance flexibility highlight Whirlpool's '61 gas ranges

AN MPM DESIGN FEATURE

WHIRLPOOL'S FIRST completely new line of gas ranges since 1956 is characterized by worthy innovations in styling and engineering.

Developed at a cost of \$2.5 million, the new product lineup includes 12 free-standing ranges, built-in ovens, gas surface units, a set-in range, and the previously announced Blanket-O-Flame surface unit.

One of the undisputed features of the new line is extensive interchangeability of parts. In the light of MPM's current

series on standardization in appliance design, this development is particularly noteworthy. The "common parts" concept is carried through the entire line — both built-in and free-standing models.

The end panel of any free-standing range, for example, is easily removed and will fit on any end of any range in the line. Savings in parts storage and production costs are obvious. Any 24-inch door will fit on the same size opening of any range, built-in or free-standing. Other parts designed for interchangeability include tops, racks, controls and backguards.

Accessibility for cleaning and service is also a dominant characteristic of the

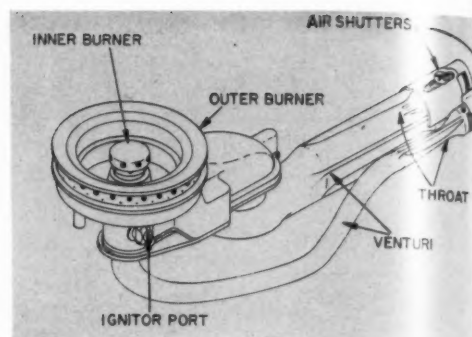
ranges. Practically all parts can be reached for service without moving the range from its permanent position in the home. Range tops, which can be raised and propped up by the housewife without the use of tools to permit easy cleaning, can be replaced without even removing the backguard.

Major assemblies, such as the oven-control tower panel, can be removed from the front without shifting the range away from the wall. Thirty parts from the free-standing models, ranging from the oven door to burners, can be quickly removed for cleaning.

Cleaning has also been simplified through the use of a raised edge, called



All gas ranges in the new line have constant-burning pilots. Models are available with fixed or adjustable orifices.



Both burners in dual burner have individual venturi but are lighted by one lighter port. The small center burner is used for the "simmer" heat when on high and for the "keep-warm" heat when on low setting.

Spillguard, all around the cooking area, and curved corners in ovens and between backguard and surface.

Dimension-wise, the free-standing ranges offer what Whirlpool calls Cabinet-Mate design — clean lines and dimensions that make each range match adjoining kitchen cabinets. All free-standing are just 25 inches from front to back and 36 inches high, the same measurements as standard kitchen countertops. All have flush sides and backs to fit snugly against walls and cabinets. The tops are 1½ inches thick, to match most countertops.

New control arrangement

Other external features of the top free-standing models include placement of controls on the right side of the cooking surface. Flip-top controls lie flat until the user presses one side down, then pop up to provide a wide, easy-to-grasp surface. Oven control and Mealtimer clock are located on the right side of the backguard just behind the counter controls and clear of any pots or pans.

The free-standing ranges include 30, 36 and 40-inch models. Top of the line in the popular 36-inch size is the Mark 36. All models are equipped with fixed orifices for use with natural gas or adjustable orifices for use with LP or mixed gases. Orifices for manufactured gas are available in kit form.

Top-line features

Features which distinguish the Mark from the other 36-inch models are a chrome oven-door liner, rotisserie, automatic clock, oven-ready signal light, "flush-flip" control knobs, and a closed "gourmet shelf" for storing spices and seasonings. A hinged front cover lifts and locks in a raised position to reveal an illuminated shelf, and the cover itself serves as a resting spot for cooking utensils during meal preparation.

Other conveniences designed into the

Mark 36 include a glass oven window, a thermostatically controlled burner, "low-temp" oven controls for maintaining temperatures as low as 140 F, timed appliance outlets, and throw-away aluminum "dispos-a-bowls."

Burner controls

Three of the four top burners on the Mark 36 are the "center-simmer" type, involving an outer or main burner and a small center burner within the outer ring.

A dual valve supplies gas to the dual burner. The valve provides fuel to either or both burners with pre-selected settings: both burners on full; the inner burner (alone) on full for simmering; or the inner burner (alone) on low for a "keep-warm" setting.

The fourth surface burner is thermostatically regulated by a Thermal-Eye control. The combination gas cock and thermostatic valve allows the user to adjust the flame to the size and type of pan with one dial. The burner used with this

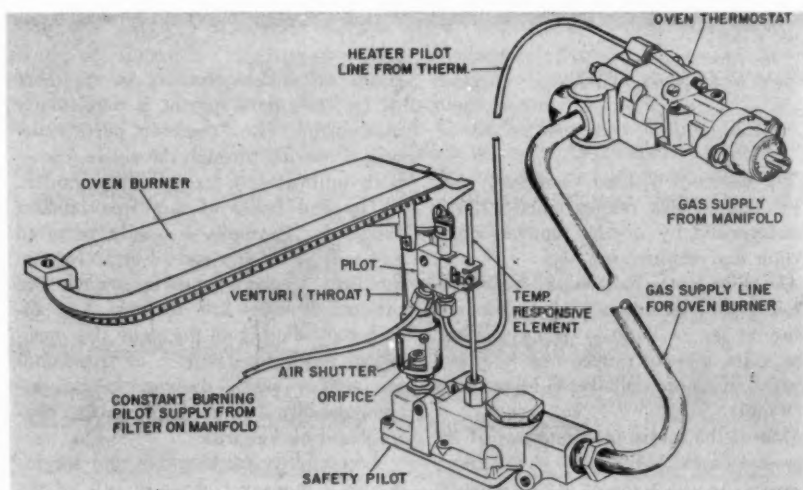
control is shaped to fit around the temperature sensor. A stand-by or "tower" pilot is controlled from the thermostat and is used to reignite the burner when the control cycles. Temperature-sensitive hydraulic fluid in the sensor and an attached capillary tube controls the on-off valve in the thermostat for heat control.

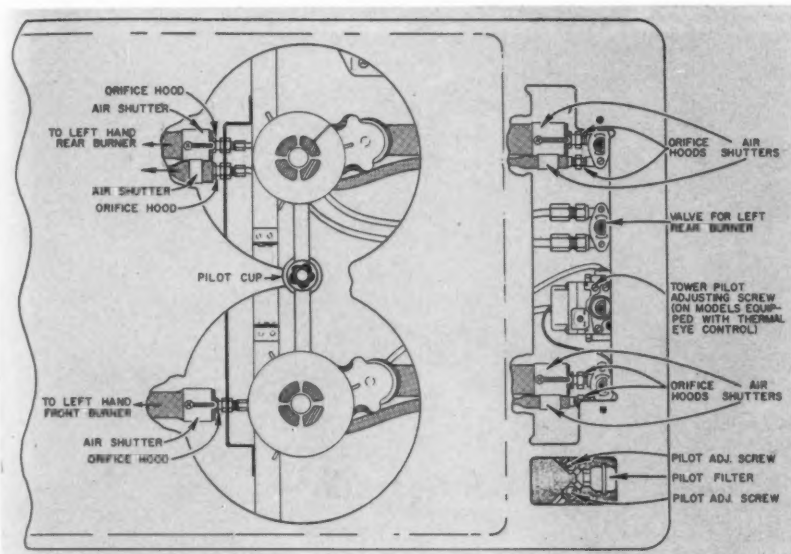
Oven burner controls

The thermostat control used in Whirlpool gas ovens is basically the same for all models. When the thermostat is turned on, it allows gas from the manifold to flow to the safety pilot and then to the burner. When the thermostat's sensing element, in the oven cavity, is heated by the oven's temperature, it signals the thermostat to restrict or shut off the gas. The thermostat's response to this signal is controlled by the degree of heat selected on the thermostat dial.

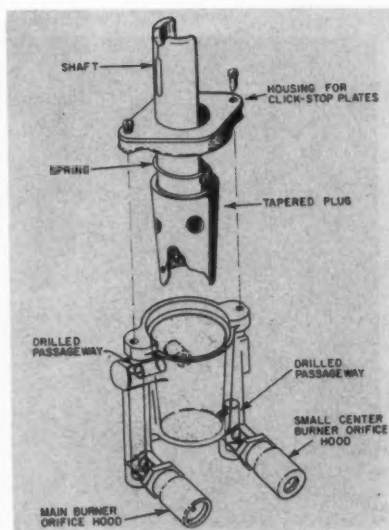
The signal is accomplished by temperature-sensitive fluid in the sensing element, which is connected by a capillary tube to the thermostat. When the signal

Oven burner control system uses temperature-sensitive fluid to operate thermostat.





Controls and adjustment locations of Mark 36 surface burners. The range has three "center-simmer" burners and one thermostatically-controlled burner.



Dual valve used with "center-simmer" burners provides gas to either or both burners with three pre-selected settings. Note that the housing has passageways on each side to direct the gas to either one or both burners.

becomes stronger than the dial setting, the thermostat reacts to limit the gas flow. The fluid expands against "billows" in the thermostat which mechanically closes the gas supply.

The safety pilot is considered part of the oven control. The constant-burning pilot at the burner is supplied gas from the manifold, not from the thermostat. The pilot does not ignite the main burner.

When the thermostat is turned on, it immediately supplies gas to another, larger pilot. This large pilot is ignited by the constant pilot. The large pilot heats a temperature-responsive element which opens the safety pilot valve, allowing gas to flow to the burner orifice, venturi and burner.

The thermostat may cycle the burner flame, but the large pilot is on whenever the thermostat is on. When the thermostat is turned off, the lack of the large pilot flame causes the safety pilot to shut off the gas supply also. Thus the gas is turned off twice: at the thermostat and at the safety pilot.

The Mark 36 is equipped with a Lo-Temperature thermostat. This gives precise control of gas oven temperatures down to 140 degrees, instead of the minimum of 200 degrees which is the lower limit of standard controls.

At temperatures above 325 degrees, the oven thermostat operates in the same

way as the standard oven control. Below 325 degrees, however, operation is somewhat different. If, at these lower temperatures, the bypass flame tends to override the temperature setting, the oven burner shuts off completely. If the temperature drops to a point where more heat is called for, the oven burner automatically relights.

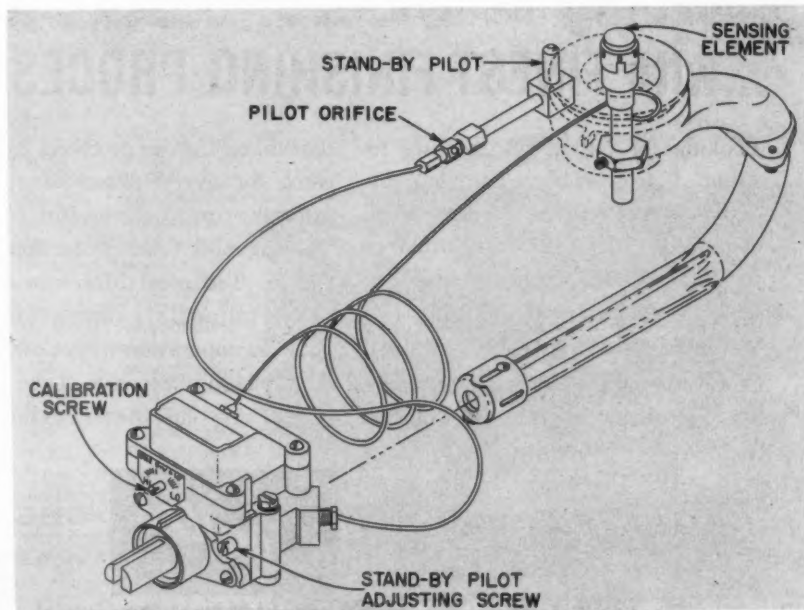
It then stays on until the oven reaches the desired temperature, then shuts off again. To accomplish this on-off cycling, which is necessary for low-temperature control, the thermostat shuts off the gas to the large pilot at the oven burner. This shuts off gas to the oven burner.

When oven temperature drops below the set point, gas again flows to the burner pilot. The flame of the burner pilot actuates the temperature-responsive element, opening the automatic pilot valve and allowing gas to flow again to the burner.

In this way, low oven temperatures are controlled as accurately as high temperatures — there are no wide temperature swings.

The other oven in the Mark 36 (the meat or B-B-K oven) is controlled by a single valve which gives a high or a low

TO PAGE 57 →



(Right) — The thermostatically-controlled surface burner uses temperature-sensitive hydraulic fluid in the sensor and capillary tube to control "on-off" valve in thermostat. Burner is mounted around temperature-sensing element.



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Precision finishing at Seeburg Corporation



Stereo music box demonstrates results of careful finishing practices. Note decorative front panel described in photo caption below.

THE PREDOMINANT FINISHES used on Seeburg equipment are lacquer and baked enamel, along with chrome and zinc plating. A seven-station phosphatizing and cleaning installation is of the manually-operated, open-tank type.

Because as many as six different parts may be passing through the organic finishing system at one time, all painting is done in hand spray booths. Installation and service instructions are affixed to the equipment by the silk screen process. Silk screen is also used for some of the decorative effects. _____MPM

A seven-page article in the October, 1960 issue of MPM described and illustrated the imaginative production techniques and the strict quality control program employed by Seeburg Corp., Chicago. The story, titled "Precision Production at Seeburg Corp.," covered metalworking, assembly and quality control. Space restrictions did not permit a description of the firm's finishing facilities. In order not to slight this phase of Seeburg's operations, we are presenting a brief "synopsis" of the procedures and equipment used in the company's finishing department.

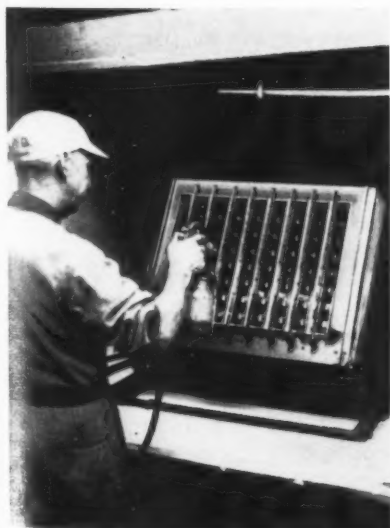
EXCLUSIVE MPM PHOTOS



(Above, left) — Seven-stage phosphatizing line has the following stations: two soak cleaning tanks; cold water rinse; acid pickling bath; cold water rinse; iron phosphate; and chromate sealer. (Above, right) — Work-

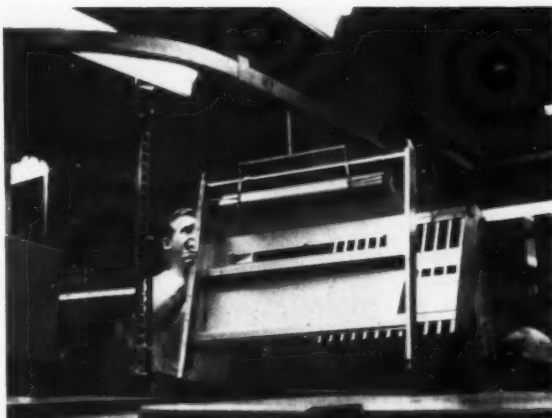


man in finishing department pushes loaded rack into batch oven. Each rack may carry from six to 16 screens, and the parts on each screen may number from ten to 100. Number of small parts makes this system necessary.



(Left) — "Highlighting" operation on chrome plated zinc die casting, which serves as front of music box cabinet, is carried out with the aid of a recently developed masking fixture. The steel fixture is pneumatically clamped to the piece, protecting the 56 points which remain bright. The piece is sprayed with a flat black enamel and the result is a contrast of flat black and highlights in brilliant chrome. The masking operation was formerly done by hand. The new method has resulted in an average production of 85 per hour. Formerly, three men produced 10 per hour.

(Below) — Finished parts are carried to assembly or sub-assembly areas on an overhead conveyor.



New Royal McBee plan



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meets unique production problems

modern plant layout and carefully engineered conveyor systems provide top efficiency in 8500 manufacturing and assembly operations

AN MPM STAFF FEATURE

THE NEW ROYAL MCBEE PORTABLE typewriter plant in Springfield, Mo. has many outstanding features. It is big, clean and well-lighted. It has impressive heating, air conditioning and powerplant facilities. It has a well-trained, efficient work force and modern, carefully selected fabricating, finishing and assembly equipment.

All of these items give strong evidence of precise planning. A visitor comes away from the plant with one impression standing out above all others—the Springfield facility has a conveyorized materials handling system that is “hand-fitted” to the particular needs of portable typewriter production. The scarcity of powered lift trucks speaks for itself.

The one-level structure of brick, aluminum and glass sits practically in the center of an 85-acre site. Plant facilities, now totaling 45 acres, can easily be doubled if necessary. Devoted strictly to

the production of manually-operated portable typewriters, the Missouri operation produces machines for Royal McBee's Appliance Div. (portables are used almost exclusively in the home).

A glance at any typewriter quickly brings to mind the special problem confronted in designing a typewriter plant. Extremely small, precision-made components are involved—and many of them. Royal portables are assembled of approximately 1750 individual parts, involving about 8500 manufacturing and assembly operations.

On the “make or buy” question, Royal can be solidly registered in the “make” column. According to Production Manager Charles H. Farrington, the plant produces 95 percent of parts used in the portables. Considering the variety of sizes, shapes and materials involved, plant layout and equipment looms doubly important.

These factors, therefore, emphasize the necessity of orderly, efficient materials handling. The requirements sound relatively simple: the materials handling system must provide a smooth flow of raw and finished parts from department to department; the parts must arrive at the right place at the right time with a minimum of manual handling.

Many hours were spent contemplating the system's design and investigating various possibilities. The final choice was two conveyor systems—one for



Techniques of carriage assembly are discussed by General Manager Kenneth Begg (right), and Production Manager Charles H. Farrington.

MPM PHOTOS

manufacturing and one for assembly. Total lineal footage of the two is almost one and one-half miles.

Manufacturing conveyor

The manufacturing conveyor, which serves the fabricating, machining, finishing and heat treating departments, is a closed-loop type, consisting of three loops within a major loop. A “pin-set” system is used to route 7500 metal tote pans to any of the various manufacturing departments throughout the plant.

The manufacturing conveyor system is a combination of live roller, belt and gravity conveyors. Pans are routed to departments by placing two selector pins in the proper holes in the front and back of each pan. The pins project above the pans and engage guides which divert the pans to the proper loop or spur conveyor.

The system has three main functions:

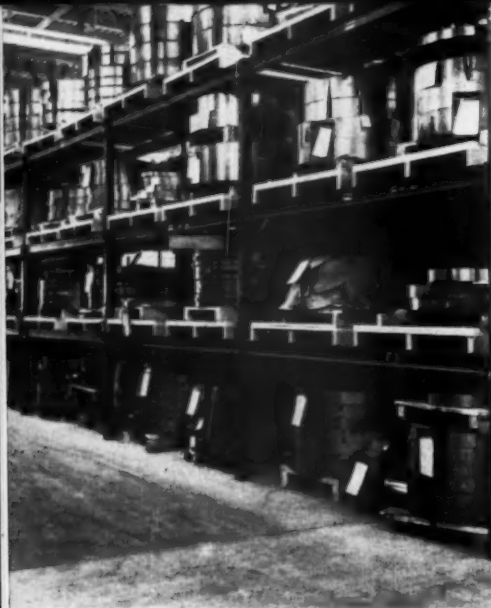
- It provides conveyorized handling of tote pans of parts from work or storage areas to inspection and weighing positions, and from there to the main loop with a minimum of handling.
- Pin-set tote pans of parts may be conveyed from any sending station to any receiving station and from the main

(Left)—Before top, rear, and front covers and carriage ends are added to assembled typewriter, a careful test is made for alignment of type. Type arms are straightened, if necessary. Finally, skilled typists make typing tests of fully assembled machines, and individually typed “certificates of performance” are placed in each typewriter. This lists actual results of final performance test.

ROYAL MCBEE PHOTO

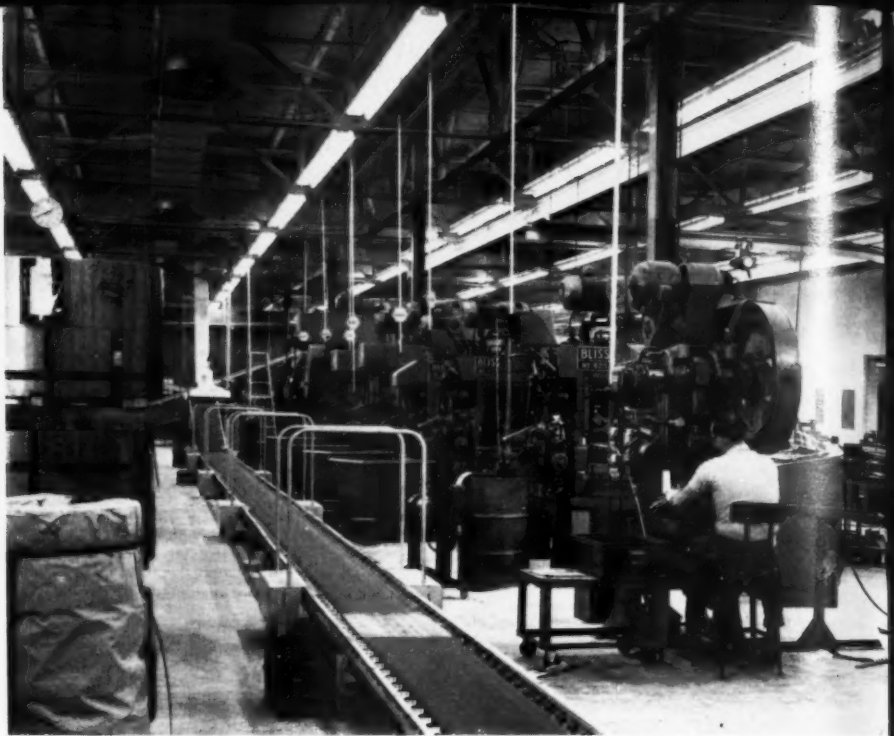
Royal's Springfield, Mo. 45-acre plant is located on an 85-acre site. Facilities of one-level structure can easily be doubled.





Cut-to-width coil stock is stored on steel racks adjacent to blanking area. Material used in the plant includes low and high-carbon steel, stainless steel, leaded alloys, screw machine stock and brass.

MPM PHOTOS



Blanked stock produced by seven blanking presses is loaded in steel pans and placed on a motorized continuous-belt conveyor which carries them to tumbling, weighing and counting area. Presses range from 25 to 150-ton capacities. The entire battery requires only one setup man and one operator.

loop to receiving conveyors. Pin-set pans may be dispatched from any sending conveyor to any other receiving conveyor in the system.

● The system provides live accumulation of parts from main loop to a given receiving station so that receiving operators do not have to attend receiving conveyors constantly—only at spaced intervals, depending on the flow of parts. In this way, the receiving operators handle the pans of parts in quantity and are free to perform other functions until the accumulation conveyor at each station is again filled.

Assembly conveyor

The other half of Royal's unique materials handling installation weaves through the assembly department. In contrast to the manufacturing conveyor,

the assembly conveyor consists of triple-decked carriers which hang from chain-drawn trolleys.

In addition to the main assembly conveyor, which serves approximately 65 percent of the assembly area, six "minor" conveyors are utilized to convey parts or sub-assemblies between assembly departments.

All parts which are supplied directly to the main assembly line from the stockroom are delivered in pans on the main conveyor. Pans carrying parts are identified as to part number, carrier number, assembly station, and whether the pan rides on the bottom or middle tray.

The carriers pass the assembly stations at eye level and, since they are numbered consecutively, assemblers can determine when their pans of parts are

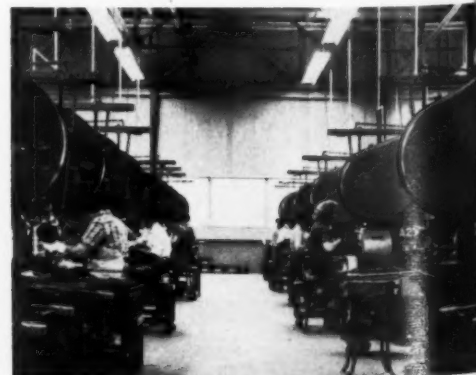
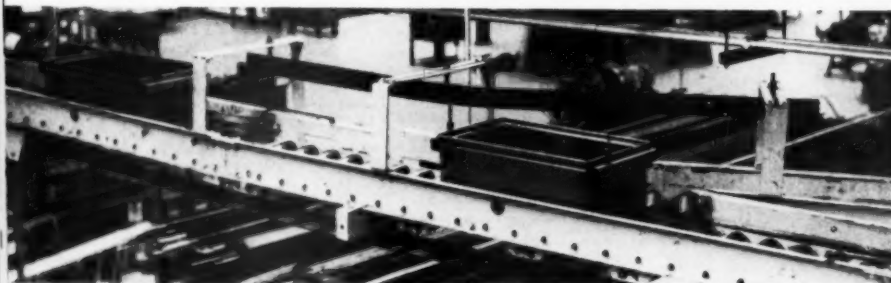
approaching. Normally, operators on the assembly line have to replenish their parts supply from the carriers only once a week.

Fabricating and machining

The jump-off point for most manufacturing operations is the screw machine and blanking department adjacent to shipping, receiving and storage areas.

Section of secondary power press department where a variety of stamping, forming and punching operations are performed. The department is equipped with 46 OBI presses ranging from 2 to 90-ton capacities, and one horn press. A majority of these presses are equipped with pneumatic die cushions which provide clearance for stamped parts or slugs to fall freely through the bolster. The bolster in each press is fitted with a standard opening to suit the largest die used. The bolster holes are reduced in size to accommodate smaller dies by the use of round inserts. The presses are equipped with discharge chutes extending through the frame.

Two loaded tote pans travel on overhead main loop of conveyor from weighing and counting station. Note guide which will deflect properly pinned pans to spur conveyor leading to secondary power press department.





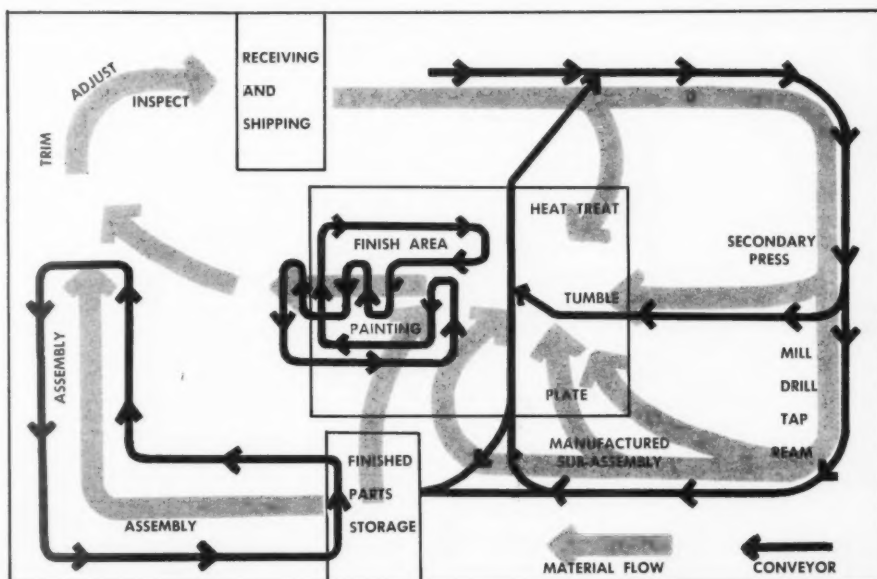
Running parallel to the blanking equipment is a line of 50 multiple-spindle automatic screw machines. The machines turn out many of the 1750 parts required for the portable typewriter. The company produces 95 percent of these parts.



(Right, above) — Counting and weighing stations at end of blanking and screw machine line. Stamped stock is routed to this point following dry tumbling to remove oil and small burrs. Screw machine parts are fed to cleaning and drying equipment prior to counting and weighing. After weighing, operator positions selector pins in the tote pans, which allow them to be routed to any station in the plant. Unpinned pans are automatically shunted off the main loop to pan washer.

The plant is laid out so parts or materials leaving the receiving area travel clockwise throughout manufacturing and assembly, with less than five percent "backward" movement.

Seven blanking presses and 50 multiple-spindle automatic screw machines are served by belt-type floor conveyors. Blanking equipment consists of seven presses, ranging from 25 to 150-ton capacities. Six are double-crank, high-speed blanking presses; the seventh is

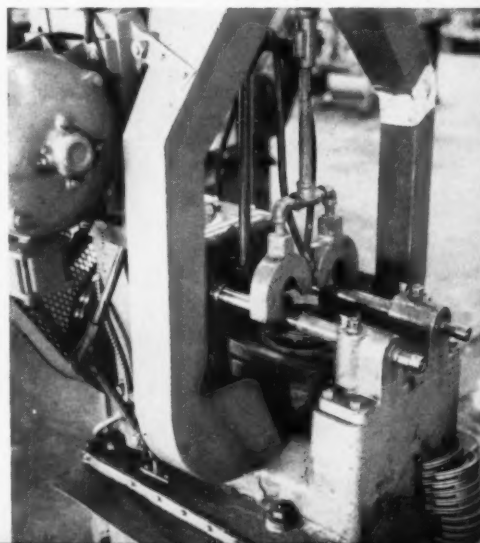


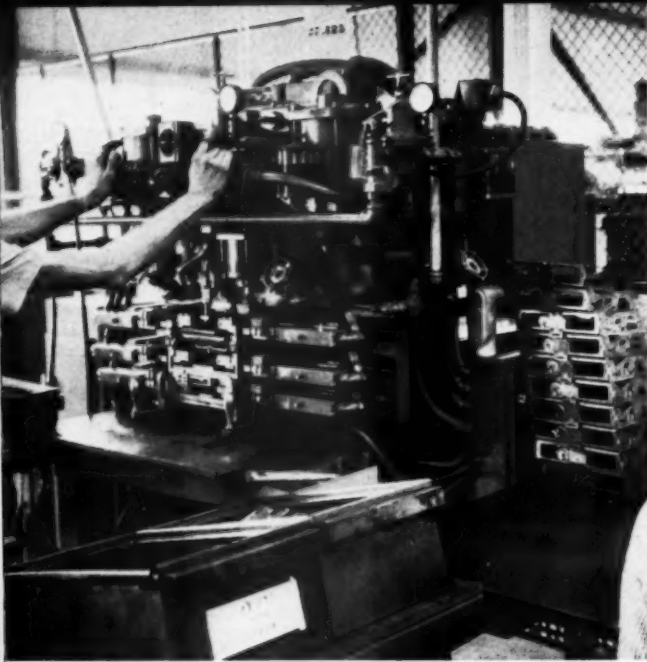
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(Left) — Equipment in general machining department includes wire forming machines, spring winders, wire trimmers, riveting machines, spot welders, and drilling and reaming machines. Pictured here is an induction brazing machine for joining three arms to a 9/16-inch rod to form the space bar frame.

(Right) — One of nine machines for slotting cast iron segments which support type bars. Two segments are clamped on a rotary index table which feeds upwardly toward carbide insert cutters on parallel arbors. One slot is produced in two segments simultaneously. When the cut is completed, the table lowers and indexes the segments into position for the next cut. Forty-four slots must be milled in each segment. One man handles nine machines.





Multiple-spot welder makes ten spot welds on base frame of typewriter. Welded frames are stacked at right. Operator places two side members, a back member, and front and middle combs in a fixture, hand-clamps the pieces, and pushes the fixture into approximate welding position. Two start buttons are pushed and the welds are made automatically.



One of several four-station machines designed and built by Royal McBee for soldering type slugs on type bars. Type is selected from magazine behind operator's hands and located in a matching matrix, which is spring-held in a nesting fixture. A permanent magnet holds the type to the matrix. The proper type bar is dropped into position, and the fixture is indexed to the second position, where flux is automatically applied. At the third station, wire solder is fed from a coil and a torch head with two flame nozzles lowers and performs the soldering. The soldered joint is cooled by a jet of air at the fourth station, and the sequence is repeated with the next type character and matrix. Indexing allows operator to work four assemblies at a time.

a 75-ton OBI. The seven presses are operated by one setup man and one operator.

Blanked stock and parts turned out by the screw machines are carried on the floor conveyors to cleaning and drying equipment, tumblers, and weighing and counting areas.

From this point, tote pans of blanked or screw-machined parts are placed on the main loop of the conveyor system and routed to the secondary power press department or the general machining and sub-assembly area. In some cases, these additional operations are not required, and the parts are routed directly to the finishing area.

The secondary power press department is equipped with 46 OBI presses and one horn press. The OBI presses range from two to 90-ton capacities, with 30 in the 25-ton category.

Parts routed to the general machining area are processed in a wide variety of equipment, including wire forming machines, spring winders, wire trimmers,

riveting machines, induction brazers, spot welders, and drilling and reaming machines.

Assembly

In addition to the final assembly system the plant has three major sub-assembly lines — type bar lever and segment, base frame and carriage. These

A second major sub-assembly is the carriage.



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Main assembly conveyor is loaded in stock room as three-trayed parts carriers pass over work counter. Stockroom furnishes most small parts for sub-assemblies and final assembly.

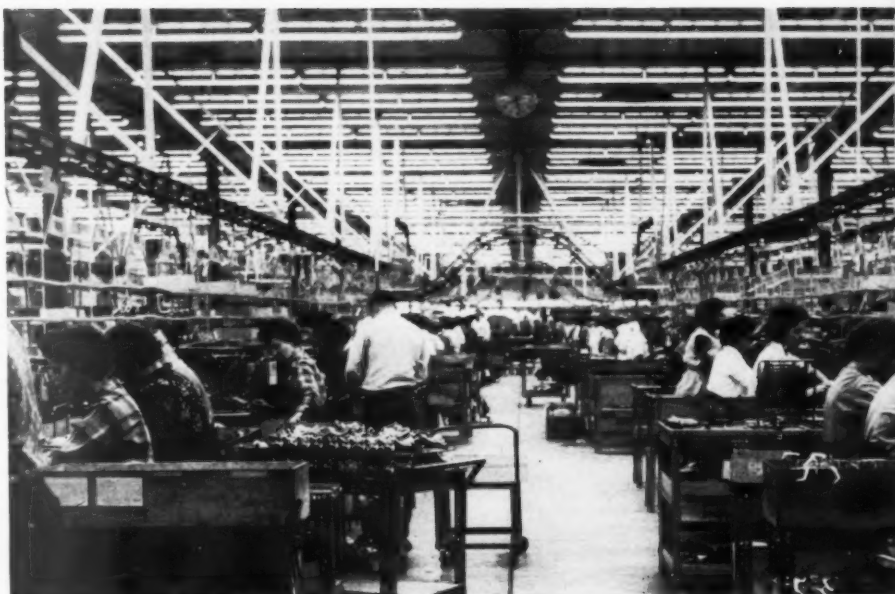
sub-assemblies are transferred to the final assembly area by overhead mono-rail conveyors.

Final assembly of the typewriters is performed on three parallel lines and a shorter fourth line, which is used for partial or special assembly work. The three main assembly lines are broken in two places to allow for the variations in assembly speed inherent in this type of complex operation. Overhead merry-go-round conveyors carry the units across the breaks in the assembly line and also provide temporary in-process storage.

Work is held by tubular steel fixtures which slide easily from station to station on the steel-topped work benches. The fixtures can be turned to any working position for ease of assembly. **MPM**



One of three major sub-assemblies is the base frame. Here, an assembler places key levers in frame.



(Right, center) — General view from beginning end of final assembly lines. Partially assembled units are attached to tubular steel fixtures which slide easily from operator to operator on steel-topped work benches.

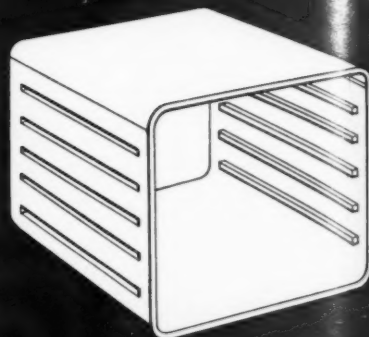
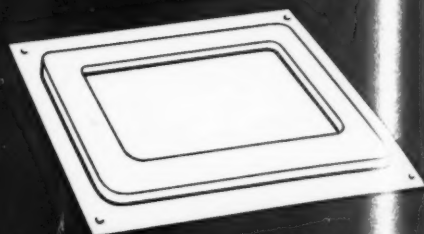
MPM PHOTOS

(Left) — Overall view of final assembly area. Note consecutively numbered carriers (foreground) carrying parts from sub-assembly lines and stock room. Numbering system enables assemblers to determine when their pans of parts are approaching. Part pans are identified by part number, carrier number, which of the two bottom trays the pan is intended to ride on, and assembly station. Empty pans are placed on the top tray of any carrier. For most parts, operators replenish their supply from the conveyor only once a week.

MPM APRIL • 1961

(Right) — Final assembly lines are broken in two places to allow for the variations in assembly speed inherent in this type of complex operation. Conveyors pictured here are elevated to provide clearance over aisle areas where the breaks occur.





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Provides excellent coverage at *3-mils* thickness... with less black specking and tearing, a minimum of drain streaking, fewer rejects due to chippage and assembly-line damage.

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($3\frac{1}{2}$ to 4 mg./in² weight loss compared to 15 to 16 mg.), successfully withstands normal flexing and handling.

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Photo from third annual section — July, 1960.

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A sample copy of MPM, a copy of last year's special section, or any additional information you may need will be sent on request.

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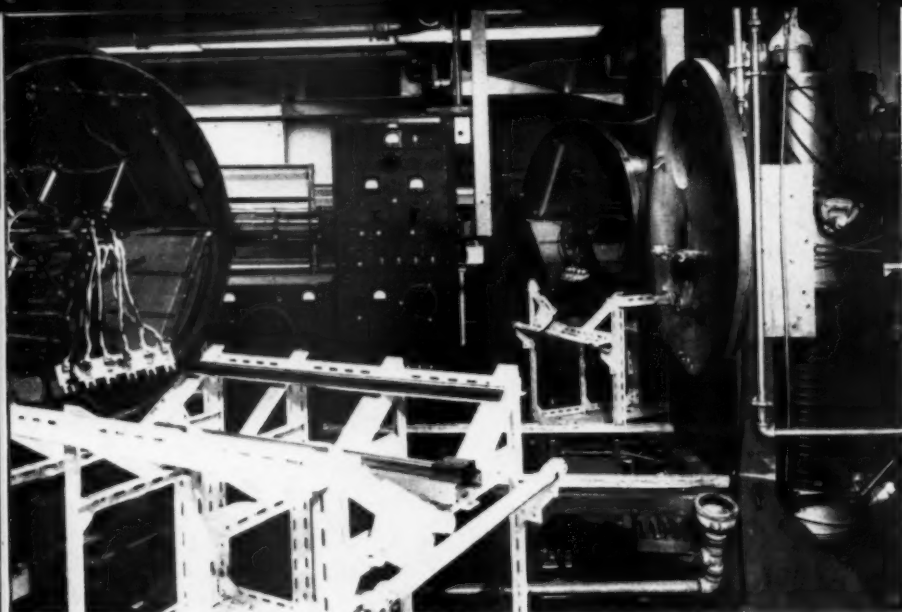
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After being properly masked, the glass and plastic-based lamps are placed in racks for insertion into the large vacuum chamber where an aluminum electrode will be vacuum deposited on the phosphor surface. The rack can be seen inserted into the vacuum chamber at left. Aluminum is deposited to a minimum thickness of 1,200 Angstroms. With the second electrode applied, the lamp is ready to be tested for the first time. Sample testing is employed for process control. The aluminum electrode is given a very light coating of protective resin so that the lamp can be handled without marring the finish. This step is not necessary on metal-based lamps.



Between multiple phosphor applications, glass and plastic-based lamps are dried in a conveyorized oven to cure the lacquer. This stabilizes the lamp and prepares it for the deposition of the metal electrode. Since the lamp

Electroluminescent lighting moves ahead

a story of Rayescent lamp production at the Westinghouse Bloomfield, N. J. plant

BY *Blanchard A. Perry* • MANUFACTURING MANAGER, RAYESCENT LAMP DEPT., LAMP DIV., WESTINGHOUSE ELECTRIC CORP., BLOOMFIELD, N. J.

ELECTROLUMINESCENCE, the 19-letter word for describing the production of visible light by the direct application of an alternating field to a special phosphor, was first discovered by George Destriau in 1936. It was easy for lighting specialists to visualize many interesting applications for a "paper thin" lighting medium, if this phenomenon could be developed for practical application. Since Destriau's first work on this subject was published in 1947, there has been a great deal of technical manpower and money poured into a development program. As a result, the electroluminescent light source has, during the few intervening years, progressed from the research-development stage to the point of successful plant production.

Now, for the first time, it is possible to replace the complex rotary sealing-exhaust equipment for producing a glass-enclosed light source with a simple system of spray booths, conveyors, silk screening stations, and furnaces. It is the purpose of this article to show MPM

readers the fundamental steps in manufacturing Rayescent lamps, applying electroluminescence at Westinghouse.

Electroluminescent lamps of various types, shapes, and sizes can be manufactured with the same general construction. The resulting "lamp" is equivalent to an electrical capacitor with the two conducting electrodes, one of which must be transparent, separated by a dielectric in which the electroluminescent phosphor has been embedded.

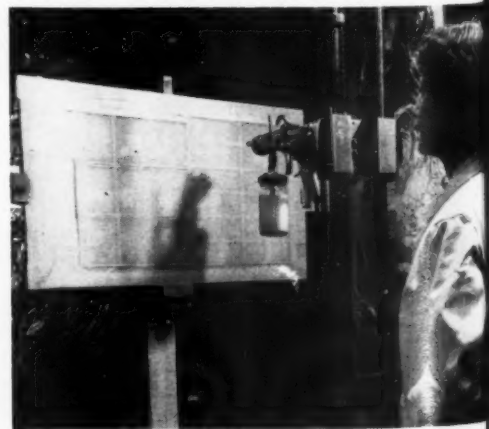
Currently there are four general categories: (1) metal-based lamps with ceramic dielectric, (2) glass-based lamps with plastic dielectric, (3) plastic-based lamps with plastic dielectric, and (4) glass-based lamps with ceramic dielectric. This article will concern itself mainly with the first type of lamp listed.

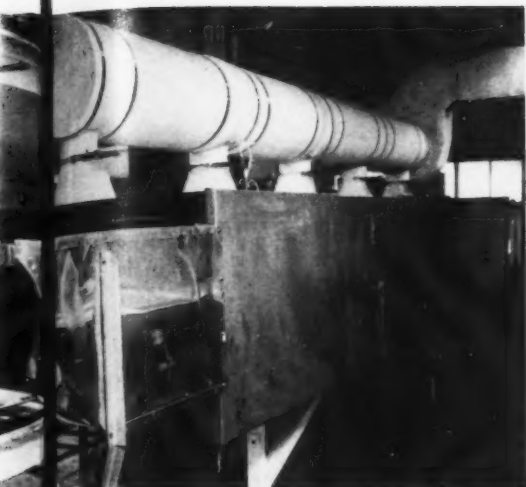
One advantage of a metal-based lamp is that it is not as moisture-sensitive during manufacturing as is the case with glass and plastic lamps. It does, however, require higher firing temperatures and more costly equipment to produce. It

also differs from other types in that the base is not a light-transmitting medium.

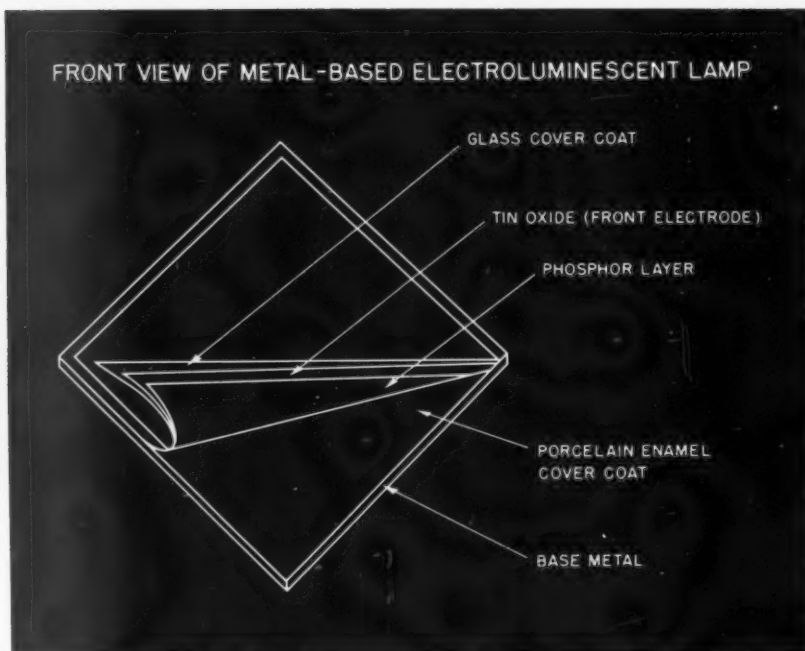
The metal base for this type of lamp forms a rigid back and also serves as an

A Rayescent panel being sprayed by the air gun technique. The air gun is mechanized to eliminate variations in coatings. A similar technique is also used on metal-based lamps.





and placed in an electrical capacitor, additional masking is necessary to prevent the metal electrode from being deposited on one of the busbars and allows evaporation onto the other busbar to provide an electrical connection.



General construction of a metal-based lamp with ceramic dielectric.

electrode. Enameling-type steel can be used as the base and coated with a white porcelain enamel as a reflecting surface.

The steel is first properly cleaned by a standard metal preparation process for porcelain enameling; the base layer is applied by spray technique, using a specially developed porcelain enamel formula which fires at 1470° F. This porcelain enamel base coating serves as a reflector and also doubles as a breakdown layer in the lamp.

Silk screen process used

A mixture of phosphor and frit is suspended in ordinary silk screening oil and applied to the lamp base by the silk screen method. By using the silk screen method, a uniform thickness of coating can be easily applied without loss of coating material. The lamp is then dried at 300° F to drive off the screening oils, and then is fired in a furnace at approximately 1200° F. As the lamp leaves the furnace at 1100° F, it is immediately sprayed with an aqueous solution of tin chloride to form the transparent electrode. The lamp is then allowed to air cool to room temperature.

Once cool, the tin oxide around the lamp edges is removed by sand blasting. A silver paint connection is then applied to this layer to provide a positive electrical connection to the second electrode. The silvered area is protected by a mask while a cover coat layer of clear glass enamel is sprayed over the entire surface area of the lamp. The mask is then removed and the lamp is sent through a

furnace at 1200° F to fire the enamel and produce a transparent glossy coating. This coating is an electrical insulator which protects the user of the lamp from shock and seals the lamp against moisture. As the lamp leaves the furnace, it again cools to room temperature and is tested for light output and proper voltage characteristics. Depending on the end use of the lamp, leadwires may be soldered to the contact area and covered with a protective varnish, or the

contacts may fit into some mechanical pressure device while being assembled into an outer housing.

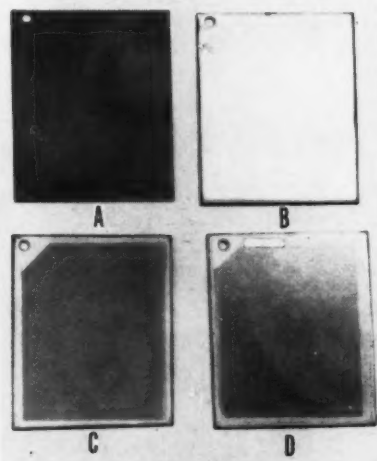
If the lamp is to be used under conditions of high humidity, additional moisture protection can be gained through the use of a transparent epoxy covering layer.

Cleanliness a must

The first requirement for manufacturing a good electroluminescent lamp is an

TO PAGE 68 →

(Below, left) — Wires are being soldered on the busbar prior to preparing the glass-based lamps for moisture protection. On metal-based lamps, wires can be soldered directly to the base. (Below, right) — This photograph shows the progressive steps in the production of an electroluminescent lamp of the metal-base type. A shows the metal base; B the white porcelain enameled reflector-type coating; C the lamp after silk screening with a mixture of phosphor and enamel; and D completed lamp after application of tin chloride to form transparent electrode.



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EIGHTH ANNUAL MARKET AND STATISTICAL REVIEW

The Appliance and Fabricated Metal Products Manufacturing Field

SUMMARY — FACTORY SHIPMENTS AND/OR SALES

(Typical segments only — data not available for many products)

Product	1954	1955	1956	1957	1958	1959	1960
Air Conditioners, Room & Central	1,514,100	1,472,400	2,082,500	1,803,100	1,903,500	1,987,300	1,881,000
Electrical Appliances.....	72,475,700	82,009,600	96,923,900	89,685,500	79,701,800	89,286,000	87,921,000
Heating and Cooking Equipment							
Gas-Fired.....	7,398,300	8,612,200	8,392,100	7,536,600	7,833,800	8,519,000	7,496,500
Oil-Fired.....	1,488,500	1,502,900	1,418,100	1,138,200	1,075,500	1,151,000	n. a.
Home Laundry Equipment*.....	4,388,000	5,620,900	5,946,600	5,139,700	5,042,900	5,411,300	4,663,400
Plumbing Fixtures.....	5,841,000	6,595,700	6,001,300	5,261,900	5,761,200	6,857,100	6,012,400
Steel Kitchen Cabinets.....	3,372,000	4,046,000	3,000,000	2,490,000	2,000,000	1,350,000	1,150,000
Steel Shipping Barrels, Drums & Pails					103,669,600	114,179,000	102,284,100
Typewriters.....						1,283,000	1,191,000
Total Units.....	96,477,600	109,859,700	123,764,500	113,055,000	206,988,300	230,023,700	212,599,400

* (1954 to 1956 domestic only. Subsequent years, domestic and export.)

DATA SOURCES: National Electrical Manufacturers Association; Gas Appliance Manufacturers Association; American Home Laundry Manufacturers Association; Air-Conditioning and Refrigeration Institute;

Vacuum Cleaner Manufacturers Association; Steel Kitchen Cabinet Manufacturers Association; U. S. Department of Commerce; EM Week; and MPM estimates.

HEATING AND COOKING EQUIPMENT

Factory Sales

GAS-FIRED	1954	1955	1956	1957	1958	1959	1960
Boilers.....	80,200	90,100	96,300	105,400	123,200	147,700	141,800
Conversion Burners.....	224,400	209,100	186,900	163,500	142,000	156,200	132,600
Direct Heating Equipment.....	1,431,700	1,729,100	1,699,000	1,439,800	1,485,000	1,446,300	1,183,900
Floor Furnaces.....	172,500	164,400	127,300	104,000	97,500	97,300	86,700
Furnaces.....	678,000	874,400	812,600	703,200	853,700	1,053,400	899,700
Incinerators.....	81,900	71,700	71,300	53,800	51,800	43,800	42,200
Ranges, Free-Standing.....	2,021,500	2,234,800	2,012,100	1,771,500	1,652,700	1,657,500	1,474,200
Ranges, Built-In.....		100,000	165,300	197,200	231,700	353,000	341,600
Unit Heaters & Duct Furnaces...			152,200	139,500	133,800	160,700	165,800
Wall Furnaces.....	347,600	390,400	307,000	326,400	389,000	449,500	366,500
Water Heaters.....	2,360,500	2,748,200	2,762,100	2,532,300	2,673,400	2,953,600	2,661,500
Total.....	7,398,300	8,612,200	8,392,100	7,536,600	7,833,800	8,519,000	7,496,500

OIL-FIRED

Boilers.....	184,500	196,500	191,500	139,500	136,400	140,200	NOT AVAILABLE
Conversion Burners.....	250,900	241,000	170,200	150,900	176,200	152,900	
Direct Heating Equipment..... (Including other Liquid Fuels)	686,500	634,500	659,600	521,300	466,700	473,900	
Floor Furnaces.....	45,700	38,700	31,400	20,800	15,800	14,300	
Furnaces.....	302,600	371,200	347,500	290,200	255,700	344,000	
Wall Furnaces.....	18,300	21,000	17,900	15,500	24,700	25,700	
Total.....	1,488,500	1,502,900	1,418,100	1,138,200	1,075,500	1,151,000	
Grand Total.....	8,886,800	10,115,100	9,810,200	8,674,800	8,909,300	9,670,000	

HOME LAUNDRY EQUIPMENT SALES

Factory Sales

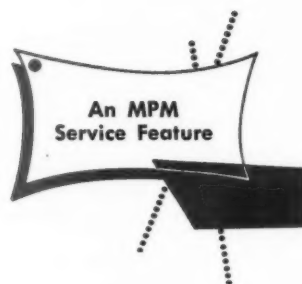
Product	1954	1955	1956	1957	1958	1959	1960
Combination Washer-Dryers.....			102,400	179,300	168,400	196,200	151,100
Washers, Total.....	3,490,200	4,236,500	4,344,900	3,684,600	3,672,300	3,833,300	3,274,200
Automatic & Semi.....	2,352,800	3,082,400	3,227,800	2,781,800	2,781,000	2,934,100	2,562,200
Wringer & All Other.....	1,137,400	1,154,100	1,117,100	902,800	891,300	899,200	712,000
Dryers, Total.....	897,800	1,384,400	1,499,300	1,275,800	1,202,200	1,381,800	1,238,100
Electric.....	661,600	1,016,200	1,167,300*	881,000	823,500	905,200	807,200
Gas.....	236,200	368,200	434,400*	394,800	378,700	476,600	430,900
Total.....	4,388,000	5,620,900	5,946,600	5,139,700	5,042,900	5,411,300	4,663,400

*Includes 102,400 combinations—separate data not available.

STEEL KITCHEN CABINETS

Factory Sales

1954	1955	1956	1957	1958	1959	1960
3,372,000	4,046,000	3,000,000	2,490,000	2,000,000	1,350,000	1,150,000



ELECTRICAL APPLIANCE SALES—INCLUDING RADIO AND TELEVISION

Product	Factory Sales						
	1954	1955	1956	1957	1958	1959	1960
Blenders.....	296,000	405,000	480,000	455,000	430,000	440,000	435,000
Can Openers.....					300,000	940,000	1,320,000
Clocks.....	6,900,000	7,200,000	9,750,000	8,400,000	7,800,000	8,100,000	8,300,000
Coffee Makers.....	3,269,000	3,675,000	5,100,000	4,365,000	4,250,000	4,750,000	4,875,000
Corn Poppers.....	815,000	780,000	640,000	550,000	595,000	685,000	730,000
Dehumidifiers.....	80,000	96,000	275,000	225,000	210,000	345,000	410,000
Dishwashers.....	215,000	295,000	400,000	390,000	424,700	547,000	559,000
Fans.....	6,880,000	5,585,000	6,865,000	5,303,000	4,445,000	4,485,000	4,672,000
Food Waste Disposers....	410,000	520,000	610,000	550,000	616,500	726,000	789,000
Freezers.....	990,000	1,100,000	975,000	925,000	1,100,900	1,084,000	1,205,000
Fryers, Deep Fat.....	1,693,000	1,925,000	1,450,000	1,100,000	440,000	345,000	290,000
Frypans.....	1,100,000	2,660,000	6,100,000	5,200,000	3,750,000	3,240,000	2,590,000
Heaters, Total.....	1,432,000	1,680,000	1,903,000	1,855,000	1,965,000	2,100,000	1,990,000
Fan-Forced.....	850,000	880,000	976,000	925,000	1,025,000	1,145,000	945,000
Non-Fan Forced.....	257,000	270,000	320,000	295,000	270,000	240,000	285,000
Wall Type.....	325,000	530,000	607,000	635,000	670,000	715,000	760,000
Heating Pads.....	1,672,000	1,980,000	2,215,000	2,055,000	1,995,000	2,560,000	2,575,000
Hotplates.....	946,000	950,000	760,000	660,000	610,000	625,000	550,000
Irons.....	6,536,000	7,930,000	8,505,000	7,625,000	5,740,000	6,747,000	6,695,000
Lawn Mowers, Power....	1,750,000	2,750,000	3,200,000	3,300,000	3,452,000	4,200,000	3,800,000
Mixers.....	2,865,000	3,240,000	4,245,000	3,600,000	2,765,000	3,060,000	3,270,000
Polishers, Floor.....	325,000	375,000	415,000	595,000	725,000	950,000	1,040,000
Phonographs*.....	2,783,000	3,006,000	4,101,000	4,872,000	4,095,500	4,390,000	5,030,000
Radios (Production)....	6,276,000	7,269,200	8,461,000	9,009,000	8,032,000	10,067,000	10,600,000
Ranges, Total.....	1,350,000	1,600,000	1,585,000	1,365,000	1,354,500	1,687,000	1,513,000
Free Standing.....	1,250,000	1,400,000	1,200,000	940,000	810,100	934,000	844,000
Built-In.....	100,000	200,000	385,000	425,000	544,400	753,000	669,000
Recorders, Magnetic....	100,000	360,000	400,000	500,000	400,000	400,000	425,000
Refrigerators.....	3,600,000	4,200,000	3,700,000	3,350,000	3,116,700	3,785,000	3,406,000
Sharpeners, Knife.....				245,000	355,000	545,000	565,000
Shavers.....	3,957,000	4,750,000	6,600,000	6,650,000	6,400,000	6,150,000	5,950,000
Television, B&W.....	7,346,700	7,757,000	7,387,000	6,399,000	4,920,000	6,350,000	5,650,000
Toasters.....	3,457,000	3,565,000	3,980,000	4,000,000	3,300,000	3,774,000	3,555,000
Vacuum Cleaners.....	2,658,000	3,270,400	3,721,900	3,190,000	3,295,000	3,421,000	3,313,000
Waffle Irons.....	928,000	995,000	980,000	895,000	775,000	780,000	740,000
Water Heaters.....	806,000	900,000	870,000	800,000	823,500	783,000	669,000
Water Softeners.....	312,000	403,000	475,000	507,500	500,000	425,000	410,000
Water Systems.....	728,000	788,000	775,000	750,000	720,000	800,000	
Total.....	72,475,700	82,009,600	96,923,900	89,685,500	79,701,800	89,286,000	87,921,000

*Includes Record Players.

AIR CONDITIONERS

(Units Sold)

Product	1954	1955	1956	1957	1958	1959	1960
Room Air-Conditioners.....	1,353,200	1,275,500	1,828,000	1,586,100	1,673,000	1,660,300	1,521,300
Central Air-Conditioning.....	160,900	196,900	254,400	217,000	230,500	327,000	359,700
Total.....	1,514,100	1,472,400	2,082,400	1,803,100	1,903,500	1,987,300	1,881,000

STEEL SHIPPING BARRELS, DRUMS, AND PAILS

Factory Shipments

Product	1958	1959	1960
Steel Shipping Barrels and Drums	31,490,600	33,530,700	30,592,000
Steel Pails.....	72,179,000	80,648,300	71,692,100
Total.....	103,669,600	114,179,000	102,284,100

PLUMBING FIXTURES

Factory Shipments

Product	1954	1955	1956	1957	1958	1959	1960
Lavatories							
Cast Iron.....	1,342,400	1,540,100	1,365,900	1,200,800	1,301,300	1,531,000	1,390,700
Steel.....	248,300	303,900	308,700	260,400	270,900	274,400	256,500
Total.....	1,590,700	1,845,000	1,674,600	1,461,200	1,582,200	1,805,400	1,647,200
Kitchen Sinks							
Cast Iron.....	1,008,900	1,060,100	921,400	778,100	817,600	875,600	728,800
Steel.....	1,169,100	1,364,000	1,318,100	1,149,500	1,200,000		
Porcelain Enameled.....						986,500	906,700
Stainless.....						420,100	430,200
Total.....	2,178,100	2,424,100	2,239,500	1,927,600	2,017,600	2,282,200	2,065,700
Sink and Laundry Tray Combo							
Cast Iron.....						52,500	45,600
Steel.....						24,300	15,600
Total.....						76,800	61,200
Bathtubs							
Cast Iron.....	1,507,800	1,678,500	1,485,500	1,301,500	1,464,300	1,677,900	1,391,300
Steel.....	564,500	648,100	601,700	571,600	697,100	825,800	647,700
Total.....	2,072,300	2,326,600	2,087,200	1,873,100	2,161,400	2,503,700	2,039,000
Metal Shower Stalls						189,000	199,300
Grand Total.....	5,841,100	6,595,700	6,001,300	5,261,900	5,761,200	6,857,100	6,012,400

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Direct-On as
well as for
Conventional
Enameling

TALK IT OVER
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CHICAGO VITREOUS
REPRESENTATIVE

HE'LL SHOW YOU
THE COST
ADVANTAGES THAT
CV 500-T OFFER YOU

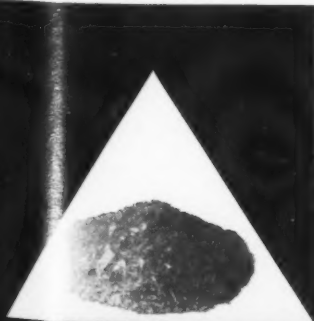
- ▶ UNHEARD-OF COLOR STABILITY OVER FIRING RANGE
- ▶ CLASS A ACID RESISTANCE
- ▶ EXCEPTIONALLY HIGH ALKALI RESISTANCE
- ▶ INCOMPARABLE RE-FIRE STABILITY
- ▶ SPOT SPRAYABILITY WITH NO VISIBLE COLOR CHANGE
- ▶ EXCELLENT SULPHATE PIT RESISTANCE
- ▶ FIRES AT LOW TEMPERATURE
- ▶ LOW STRESS
- ▶ MEETS NEMA WHITE COLOR

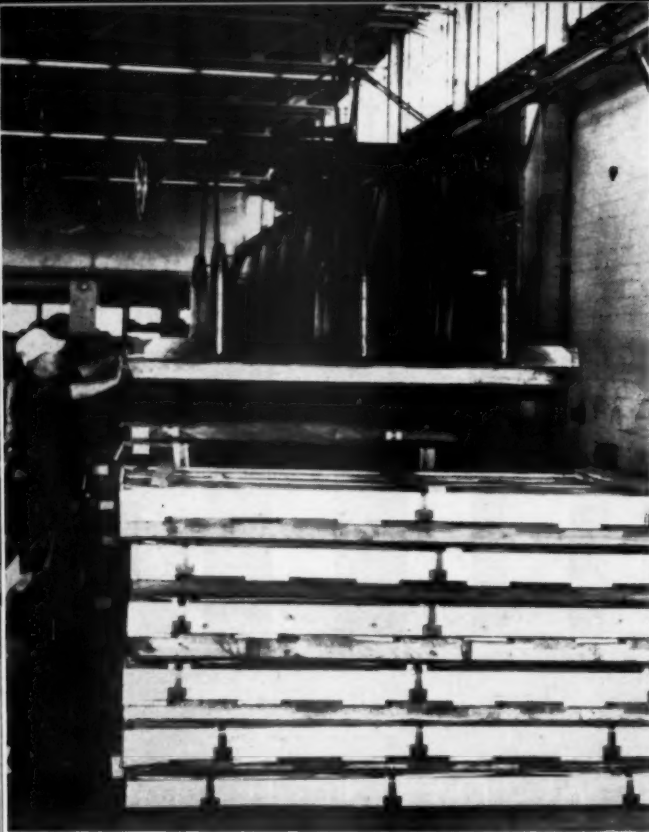
*Patent Pending

FOR FINEST FRIT—CHICAGO VIT

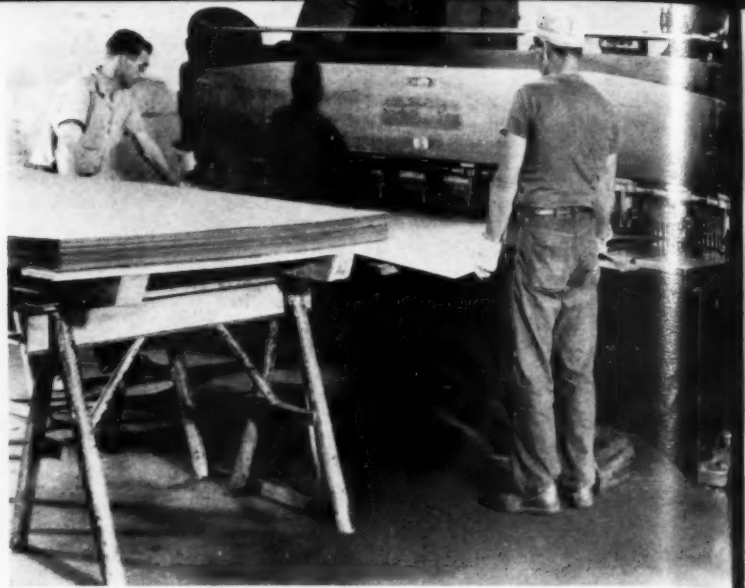
Chicago Vitreous CORPORATION
A Division of The Eagle-Picher Company
1425 S. 55th Court, Cicero 50, Illinois

Circle No. 307 on Reader Service Card.





Operator guides open bundle of vinyl-clad sheets toward shear in background. Bundles contain from 100 to 104 sheets apiece.



Sheet metal shear cuts vinyl-clad sheets in sizes ranging from 1 inch in width to 42 inches and in lengths of 8-61/64 inches up to 60 inches.

Fabricating vinyl-clad steel for kitchen cabinets

A VINYL-CLAD STEEL that in forming requires no consideration beyond that shown to uncoated sheet metal is being used by Republic Steel Corp. for fabrication of drawers and door fronts on its "Traditional" kitchen cabinet line.

The cabinet line is designed to offer the housewife kitchen units that have the

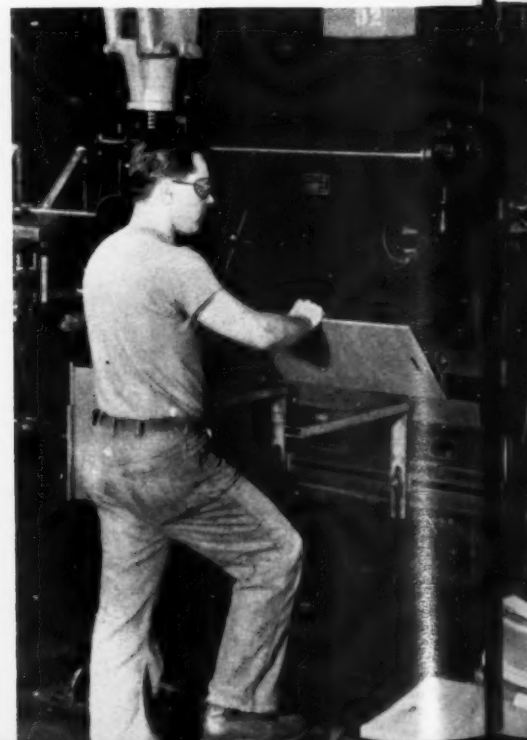
strength and permanence of steel together with the warmth and texture of fine wood. The cabinets, finished in a mahogany wood grain pattern, are easily cleaned and offer resistance to chemicals, moisture, heat and cold, the firm says.

For "Traditional" production, Republic laid heavy stress on a vinyl-clad sheet

that could be worked with existing equipment. This was especially vital to Republic since the kitchen line at the company's No. 2 Berger Division plant in Canton, Ohio, also fabricates and assembles cabinets with a baked enamel finish. Without a vinyl-clad sheet that could be formed on existing lines it

Punching and double-notching operations. Vinyl-clad front panels are at left; standard steel back panels at right.

Forming brake, 350-ton capacity, edges vinyl-clad steel sheets.



would mean, at the very least, severe losses in down time for die changes whenever a run of "Traditional" cabinets was to be made.

Supplied to Republic in the flat, the vinyl-clad sheets are bundled in crates holding from 100 to 104 each, with no protective paper necessary between them. The reverse side of the sheets are painted so that no raw metal will be exposed anywhere within the fully assembled cabinets.

The vinyl-clad sheets are supplied in two standard sizes: 48 by 93 in. and 48 by 100 in. The first fabricating steps consist of a two-step operation — shearing to strip (length) and to blank (width). Finished blank sizes for drawer fronts are in nine sizes ranging from 7-5/32 in. by 16-7/32 in. to 13-1/8 in. by 25-7/32 in. There are 24 door front sizes ranging in widths of 8 to 21 in. and in heights of 15 to 48 in. Thirty-two blank sizes are sheared for fillers and these range in size from 1 to 4 in. in width and 15 to 30 in. in length. Front panels are sheared in six sizes running from 18 to 42 in. in width and the length is standardized at 8-61/64 in. End panels for every cabinet extend from 13-1/2 to 24 in. widths and from 12 to 60 in. in length.

From the shear room the blanks are moved to the press room for double notching. Edges are then plunge-formed on a battery of press brakes, the largest of which is a 500-ton unit. The smallest is 60 tons. Operating speeds for the brakes range from 15 to 60 strokes per minute. Republic has 69 of these forming brakes.

ad steel sheets. Filler pieces are being formed on brake at rear.



Vinyl-clad sheets for "Traditional" cabinets are stamped into door fronts in this view.

After forming, front edges are wiped down and painted. Since the backs of the vinyl sheets are already painted, only the sheared edges are touched-up with a special paint.

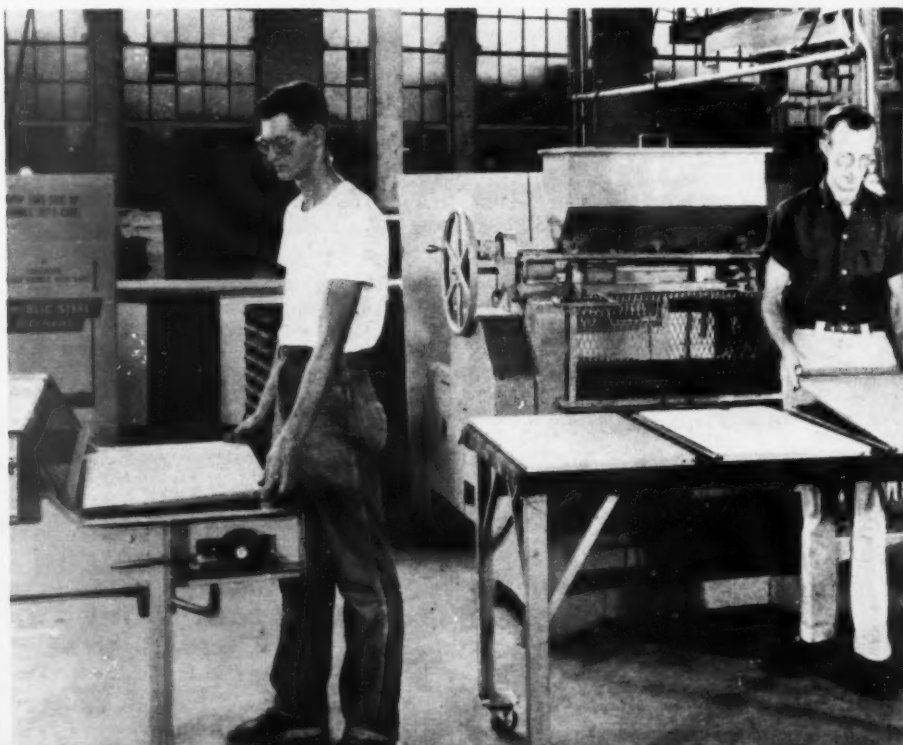
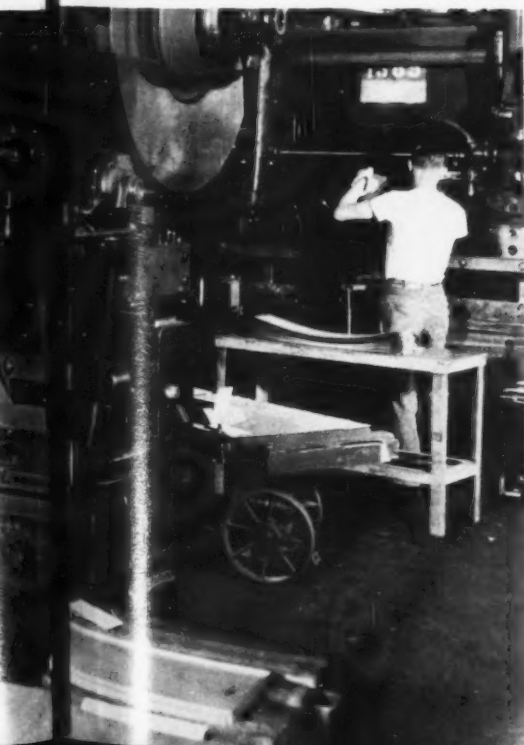
After the touch-up, the outer, vinyl-clad door and drawer fronts are forwarded to final assembly where they are bonded to the inner door or drawer fronts by means of a cold adhesive, thereby eliminating any welding steps. A core of insulation material is placed between inner and outer sheets.

Inner drawers and doors for the "Traditional" cabinets are fabricated in the same manner as the vinyl. They are sheared into similar sizes, formed in the same way and then forwarded to Berger's paint department. The inner sheets are then phosphatized and finished in baked enamel. Hardware attachment is next, and the finished parts are then assembled to their respective units.

The vinyl coating itself is a high-density vinyl permanently laminated to the

TO PAGE 57 →

Finished front and back panels are shown being assembled with insulation core. Assembled panels are then fed through bonding unit at left. A cold adhesive is used.



Allis-Chalmers combines fend off corrosion . . .



GUARDED BY GALVANIZED STEEL

When you see a big Allis-Chalmers combine like this cutting grain on the farmlands of America you can be sure that galvanized steel has been used in its construction.

Reasons? First, galvanized steel provides excellent weather protection and low maintenance cost. Neither dew nor drizzle nor drenching rain will find a chink in its zinc coating. That holds true regardless of the severity of the fabricating steps to which it may be subjected. And in addition to its corrosion resistance, galvanized steel has a lot of resistance to high cost: It's easy and economical to fabricate, construct and maintain.

WEIRKOTE® IN PARTICULAR! The galvanized steel used in these combines is National Steel's Weirkote. To the inherent strength, economy and versatility of steel, Weirkote adds enduring zinc protection via the modern continuous process. As a result, Weirkote can be worked to the very limits of the steel base without chipping or peeling. And it assures you of long-lasting protection against corrosion. It is manufactured by two National Steel Corporation divisions, Weirton Steel and Midwest Steel. Write Weirton Steel Company, Weirton, West Virginia, for further details.



MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia



divisions of
NATIONAL STEEL CORPORATION

Circle No. 365 on Reader Service Card.

Fabricating vinyl-clad

→ FROM PAGE 55

steel. Prior to bonding, the metal is thoroughly cleaned and coated with a special adhesive. The metal is heated to the proper bonding temperature and lamination is completed under pressure. Careful stabilization insures color and texture control through lamination and fabrication of the laminate. The calendered vinyl film and sheeting is pin hole free and provides protection from corrosive chemicals and atmosphere.

The vinyl is dimensionally stable up to 250 F. While trichlorethylene vapor degreasers or chlorinated solvents will adversely affect the bond, the vinyl and the adhesive used in the laminate are practically impervious to acids, alkalis and other chemicals. In tests there was no adverse effect from lemon, orange or banana peel, spinach, coffee, tea, dye, green food coloring, mustard, Clorox, ketchup and 10 percent citric acid.

Each shipment of sheets into Republic is subjected to inspection for color shade and gage. Also, the sheets are given forming and heat tests to make certain that there will be no separation of vinyl from the metal.

To Republic, the heat resistance factor is important for two reasons. The first is that the vinyl-clad steel must withstand oven and range heat. But the second is more unpredictable: difference in climate. Republic's kitchens are shipped world-wide. One might go to Alaska, and en route sit in a boxcar for days or weeks at zero-or-below temperatures. In tropical climates extreme heat is joined by another foe, high humidity. All these factors could play havoc with a laminate.

In all the fabricating steps the vinyl sheets perform without tearing, cracking or wrinkling, the company reports. The vinyl becomes a lubricant that permits better flow of metal; vinyl will compress up to 50 percent during forming, yet the inherent "memory" of the material causes it to retain any texturing despite temporary compression.

Whirlpool '61 gas range

→ FROM PAGE 35

flame on the burner. There is a *full on* and a *low* (adjustable) setting identified by click detents. The valve is equipped with a pilot line which is connected to the large pilot, rather than the constant-burning pilot. The ignition of the B-B-K oven is the same as that for the standard oven.

The Mark 36, as well as all other models in the free-standing line, are available in white, turquoise, pink, yellow and copper.

APM APRIL • 1961

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Rugged, efficient TEP Heating Units are used as supplementary heat source for heat pumps or as heat source for forced-air heating equipment. Designed to meet your own specifications, the coils may be used individually or in any combination desired.

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**FOR LONG SERVICE LIFE
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- Floating frames that eliminate rigidly welded construction and permit elements "to breathe."
- Exclusive insulator and cross-bar design is an original research development, patented by TEP.

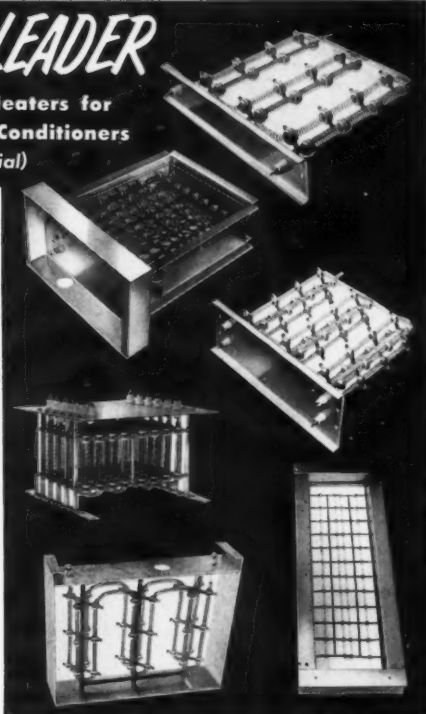
Cross-section of patented TEP insulator and cross-bar. More space for air circulation assures better heat dissipation, longer wire life. Patent No. 2921172



TEP Products

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**PRE-ENAMELED
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COIL STRIP!**

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Stainless by

CRUCIBLE

where a fine finish is only the beginning

MPM

**new supplies
and equipment**

Highspeed Slitting Saws

A line of "Sawperior" high speed saws for general purpose slitting, cutting off or sawing most materials is available from Brown & Sharpe Mfg. Co. Tooth geometry and mirror-like finish are said to quadruple tool life.

Circle No. 201 on Reader Service Card.

Current Limiting Relays

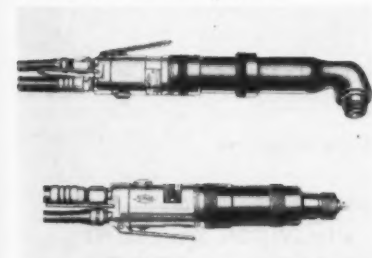


A series of current limiting relays has been announced by Line Electric Co., a division of Industrial Timer Corp. The CL Series is designed to protect equipment against damage from excessive current. In operation, the CL relay acts much like a circuit breaker but with one important feature: contacts lock on a sustained overload, and they cannot be reclosed, even momentarily, until the overload has been corrected.

Models are available to cover a wide range of applications including dc generators, transmission lines, oscillators, amplifiers, induction welders, computers, etc.

Circle No. 202 on Reader Service Card.

Air Driven Assembly Tools



A line of Sioux air powered drills, screwdrivers and nut runners has been introduced by Albertson & Co., Inc. Handles, motors, gear cases (rpm), and clutches are interchangeable. A thousand different combinations are possible to assure that a tool exactly fits the job for which it is intended. Any one of the sub-assemblies can be quickly changed to convert a tool to a different need. The tools have been designed for long life and continuous duty on assembly lines.

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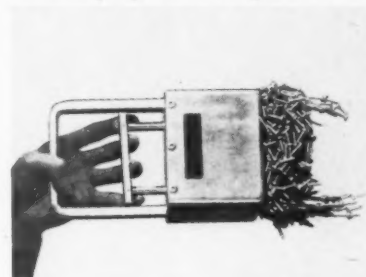
Phosphatizer For Soak Or Spray

A phosphatizing process that deposits a heavy, crystalline, zinc phosphate coating on iron and steel has been developed by The Diversey Corp. The company reports that its new Diverfos Z-1 zinc phosphatizer performs equally well in soak or spray operations. It is specially formulated to keep sludge formation at a minimum.

In spray washer operations, coatings weighing from 150 to 300 milligrams per square foot are produced. Soak tank processing produces coatings weighing 300 to 600 milligrams per square foot. The resultant coating conforms to Specification MIL-C-490, Grade I Process.

Circle No. 204 on Reader Service Card.

Manually-Operated Magnetic Unit



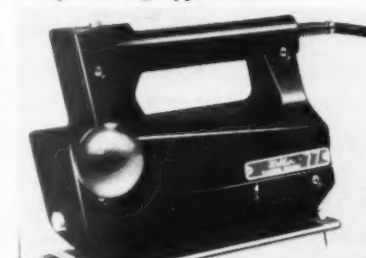
A manually-operated magnetic unit for handling small or large metal parts has been announced by the Magnetic Products Div., Jess Corp. The unit can also be used for feeding round, square or irregularly-shaped sheets into presses, shears and similar production equipment.

Ideal for small parts packing, sorting and weighing operations, the hand magnet picks up and securely holds a quantity of loose nuts, bolts, screws or other light metal objects.

The device also separates stacked metal sheets and is adjustable to accommodate various weights and thicknesses.

Circle No. 205 on Reader Service Card.

Reciprocating-Type Sander



The Model 77 Sander is a straight line unit having a 5/32-inch stroke. Long life rubber bearings eliminate wear and lubricating problems. A removable knob adapts the sander, a product of Weller Electric Corp., to either left or right hand operation and allows free access into corners. The unit operates at 14,000 strokes per minute. It is constructed with an all-plastic housing and uses a high impact plastic sanding plate. It is said to be a rugged and sturdy tool designed for heavy duty use.

Circle No. 206 on Reader Service Card.

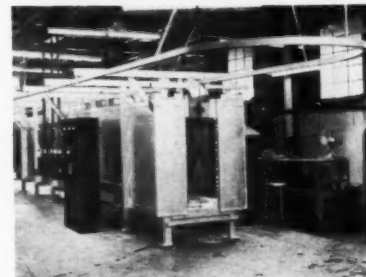
For further information on
New Supplies and Equipment,
use Reader Service Card
on pages 23 & 24.

Belt Dressing

A belt dressing, Sprayon No. 607, manufactured by Industrial Supply Div., Sprayon Products, Inc., contains neither asphalt nor resin. The dressing is intended for leather, rubber, canvas and other fabric belts, in flat, round or V-styles. It is claimed that the product will not collect dirt or dust.

Circle No. 207 on Reader Service Card.

Continuous Enameling Furnace

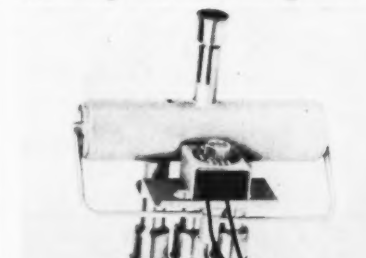


A 30-ft. continuous enameling furnace, designed and built by the Waltz Furnace Co., features its own built-in overhead conveyor. Used in the metal products fabricating and manufacturing industry, this furnace-conveyor combination facilitates the production line enameling of metal parts such as appliance panels.

The furnace allows continuous firing of sheet metal panels for both the undercoat and final enamel coat. A variable speed on the conveyor permits the firing of different types of enamel at different rates. The panels are hung on fixtures which are part of the overhead conveyor.

Circle No. 208 on Reader Service Card.

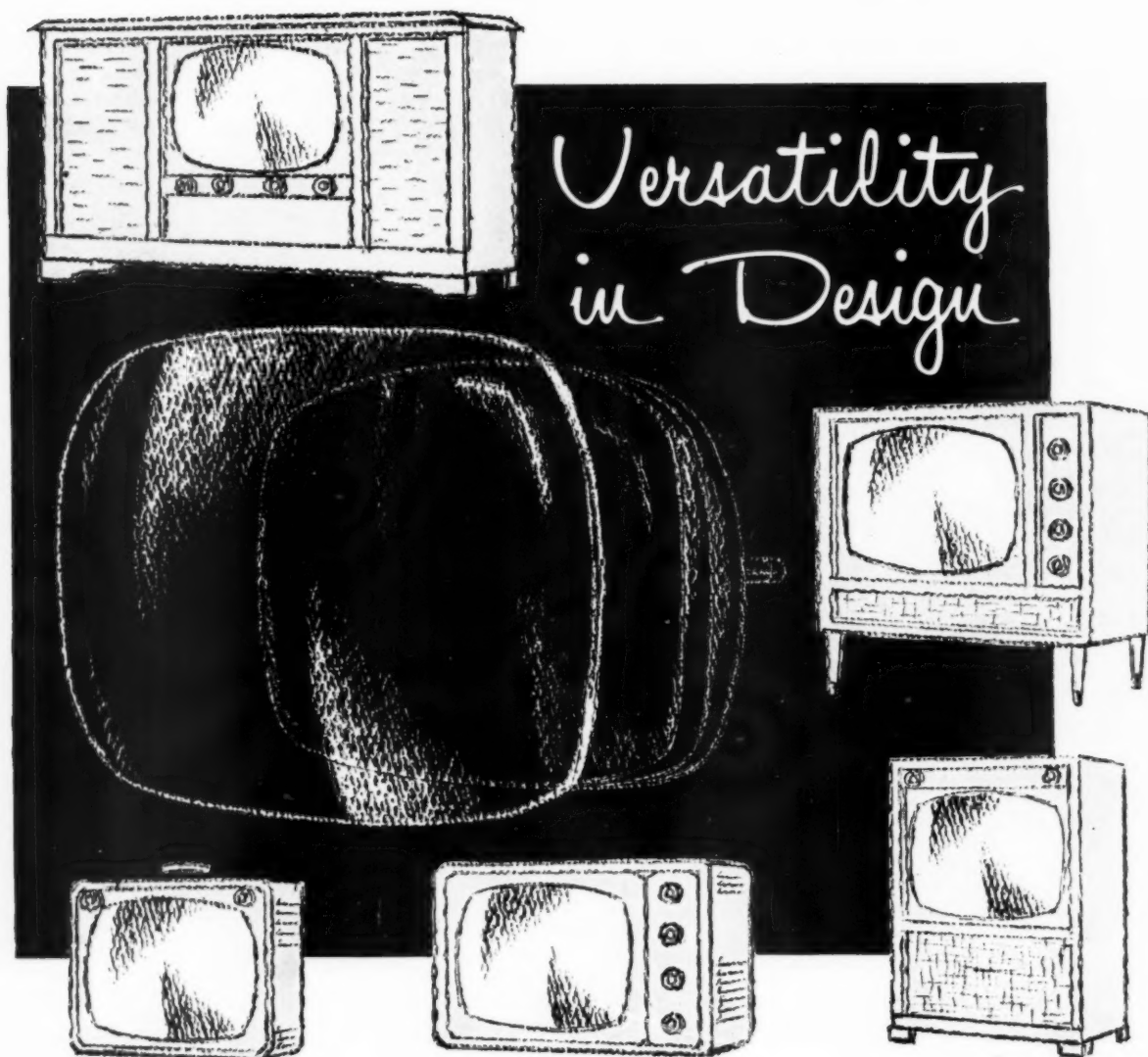
Reversing Valves For Refrigerants



All-metal, four-way reversing valves for control of refrigerants in reverse cycle air conditioning systems, heat pumps and hot gas defrost applications have been announced by General Controls Co. Designated the KV44, the device features true hermetic valves with full ported poppet-type pilot valve and plastic encapsulated coils. The pilot valve is rigidly mounted to the main valve, permitting a shift of the main slide valve with both low and high system pressures.

TO PAGE 61 →

Circle No. 209 on Reader Service Card.



Versatility in Design

GLASS — one of the most versatile of materials. In the hands of a designer — unlimited potentiality of product design — if complete freedom of both material and designer is blended. — Why limit TV design?

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Special Shapes for: Instruments, Gauges, Household and Industrial Appliances.



Bent Glass



Convex Glass



Heat-treated Glass

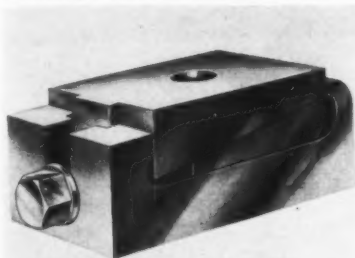
MARSCO MFG. CO., 2901 S. HALSTED ST., CHICAGO 8, ILL.

Circle No. 334 on Reader Service Card.

New products

→ FROM PAGE 59

Leveling Jacks For Machine Tools

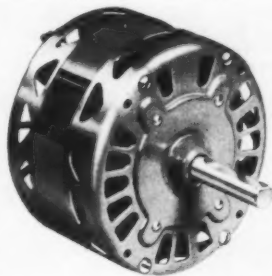


Enterprise Machine-Parts Corp. has announced a new series of adjustable leveling jacks, with capacities to 20,000 lbs. for precise level installation of machine tools, automation lines and other toolroom and production equipment. The series is designated "Empco Style J-H."

Of compact design, the units permit up to 1/4-inch vertical adjustment and feature two inter-acting inclined planes which give smooth upward or downward control without lateral movement. The vertical motion of the top plate, according to company engineers, eliminates shifting or imbalance caused by vibration or lateral stress on machine legs or tie-downs.

Circle No. 210 on Reader Service Card.

Fractional Horsepower Motor



A fractional horsepower motor, designated Type AR and manufactured by the Redmond Co., Inc., has a wide range of applications in the heating, refrigeration, air conditioning, ventilating and appliance industries. Typical applications include room air conditioners, window fans, and direct drive blowers for central heating systems.

Only 4 7/8 inches in diameter, the motor has high starting and running torques. A 6-pole motor, it is available from 1/20 through 1/4 horsepower.

Circle No. 211 on Reader Service Card.

Dry Acid Cleaner

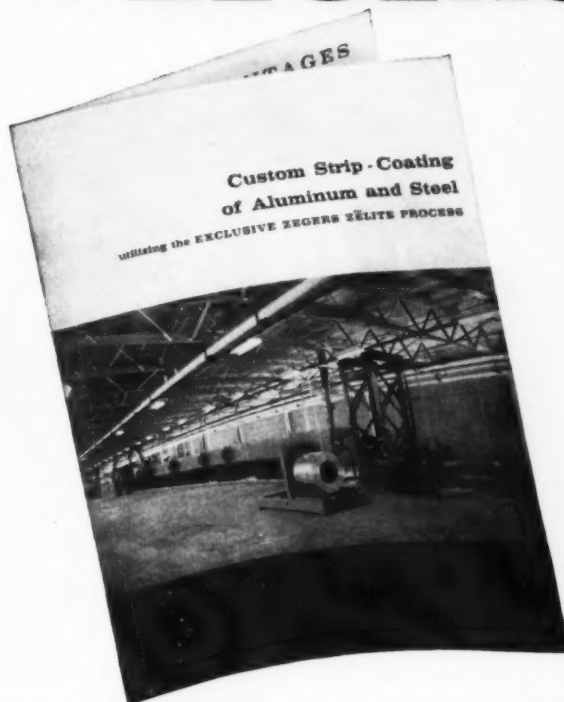
Super Di-Ca, a product of DuBois Chemicals, Inc., is based on sulfamic acid, and is said to achieve better results over older methods of acid cleaning. A powdered product, it is handled dry from the drum until it is dissolved in a dispenser or cleaning tank, ending container splashing or breakage risks. It is a de-scaling agent, primarily, plus having cleaning and inhibiting properties.

TO PAGE 65 →

Circle No. 212 on Reader Service Card.

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Get this important NEW STRIP-COATING FOLDER by **ZEGERS**



READ ABOUT THE NEW PROCESS

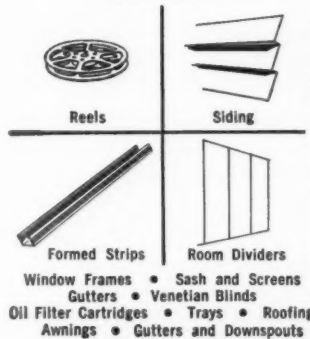
Zegers Zelite gives steel and aluminum strip the finest protection and decoration—won't mar when stamped, formed, or drawn. Beautiful luster and richness—clear or colored—resists abrasion, corrosion, acid, salt . . . won't craze, crack, or discolor. Coating selections include: vinyls, alkyds, epoxies, acrylics, plastisols, organosols.

. . . and ABOUT THE NEW PLANT

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Company _____
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City _____ Zone _____ State _____

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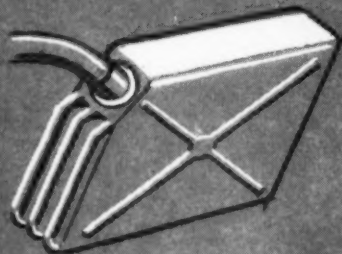
- Used as a water soluble quench for induction hardening.



- Used as an additive to soluble cutting oil and soluble grinding oil emulsions to increase rust protective properties.



- Used as a transparent emulsion for hydrostatic testing.



- Used for lubrication and rust prevention on tube rolling machines.



- Used as a rust preventive in the rinse stage of spray type washers.

THE METALWORKING INDUSTRY LOOKS TO MACCO FOR LEADERSHIP

CLEANING COMPOUNDS
CUTTING LUBRICANTS



DRAWING COMPOUNDS
RUST PREVENTIVES
FORGING COMPOUNDS

MACCO
PRODUCTS COMPANY

CHEMICAL COMPOUNDS

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PRESCOTT 9-0800

Circle No. 331 on Reader Service Card.

MACCO
#**1961**

**A new MULTI-FUNCTION
RUST
PREVENTIVE
AND
LUBRICANT**

**you can WELD, BRAZE, FABRICATE,
ASSEMBLE, PAINT *right over it***

Better check into MACCO #1961 right now if you are not already familiar with it. Here's a newly developed, multi-purpose water soluble RUST PREVENTIVE that does so many jobs so well, and so economically. You can use less concentration, and it lasts longer. Leaves a film of protection you can work over without further cleaning, and paint over, too. If Rust Prevention for between operations or for storage is part of your operating procedure, then MACCO #1961 is for YOU!

Try it! You'll convince yourself!



TESTED FOR POROSITY



Now you will have written assurance of quality that adheres to your specifications when you buy from Quaker State. During the melting and through every step in processing, QSM metallurgists and technicians test and inspect your order to be certain that it is filled according to your specifications and will meet our exacting standards of quality.

TESTED FOR POROSITY—One of the specific tests metal must meet, the test for porosity is made before a rolling ingot is cast. It assures you of aluminum that is free of gas pockets that would adversely affect the working qualities of the finished material.



QUAKER STATE METALS COMPANY

Lancaster, Pennsylvania

A DIVISION OF HOWE SOUND COMPANY

Mill Producers of Aluminum Sheet, Coil, Tubing and Extrusions

Circle No. 354 on Reader Service Card.

GENERAL EXTRUSIONS

Adds Useful Luxury To



Suburban **Viscount®** BUILT-IN ELECTRIC OVENS

The Samuel Stamping and Enameling Co., builders of over two million gas and electric appliances, called on General Extrusions, Inc. for four important parts on the front of their new Suburban Viscount line of built-in electric ovens. They found, as have many other leading manufacturers, that extrusions from G.E.I. meet all requirements for uniform quality, close tolerances and unfailing delivery. What's more, General's full range of aluminum services saves the customer time, material and money. Why not let G.E.I. solve your production problem with aluminum, the modern metal?



GENERAL EXTRUSIONS, INC.

Box J, 4040 Lake Park Road, Youngstown 7, Ohio

Sales Offices at Chattanooga, St. Louis, Pittsburgh,
Cincinnati and Cleveland

CONSULT YOUR CLASSIFIED PHONE BOOK UNDER ALUMINUM PRODUCTS

A

Clock Frame is a single extrusion which undergoes 12 separate operations — regular services at G.E.I.



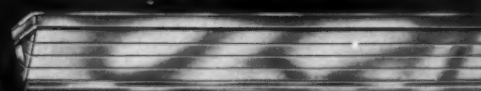
B

Nameplate letters are pressed with embossing dies, brite-dipped and spray-painted by G.E.I. specialists.



C

Frame is V-notched to wrap around three corners.



D

Vent Hood is Generalbrite anodized, as are the other three extrusions, for lasting beauty and usefulness.

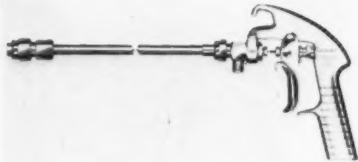


Circle No. 317 on Reader Service Card.

New products

→ FROM PAGE 61

Spray Gun for Airless Spraying



Spraying Systems Co. has introduced a line of No. 22 Series GunJet Spray Guns to provide greater reach with drip-free shutoff. The 22-HPSSTC-8980 GunJets for airless spraying are built in a choice of four models with extension lengths of 8, 18, 24 and 36 inches. In each model the valve stem extends the entire length of the extension tube. The shutoff needle is positioned immediately behind the nozzle orifice for positive, drip-free shutoff.

Circle No. 213 on Reader Service Card.

Weld Nuts For Blind Applications



Republic Steel Corp. has begun production of special Midland Weld Nuts for blind applications in bolting sheet metal products where vibration would shake ordinary nuts loose, or where thin gauges are required. They were originated and marketed by Midland-Ross Corp.

For use in fabricating sheet metal products that must be assembled or disassembled by bolting, the nuts are electrically welded into place by any standard projection welding machine of proper capacity.

A circular shoulder, or pilot, positions the nut, and four projections on the nut face are fused to the sheet metal by the welding process.

Circle No. 214 on Reader Service Card.

Alkaline Rust Preventive Cleaner

Researched and developed within the Kerns United Laboratory, a new alkaline rust preventive cleaner, known as K-6882, is said to have excellent cleaning properties and also imparts an adequate film for rust protection. It will not stain machined parts and is easy to control.

Test reports from the field prove it excellent for use in shops utilizing alkaline power washer equipment to clean shop oils and shop dirt from parts which require storage prior to assembly or further machining.

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Circle No. 215 on Reader Service Card.

MPM APRIL • 1961

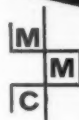
Molon fractional horsepower Motors

Skeleton Types • Gear Types



CUSTOM-
MANUFACTURED
TO YOUR
SPECIFICATIONS

We specialize in custom manufacturing all kinds of fhp motors. Whether you need skeleton types or gearmotors, standard or special, Molon can supply them fast and at low cost. Send for free descriptive circulars.



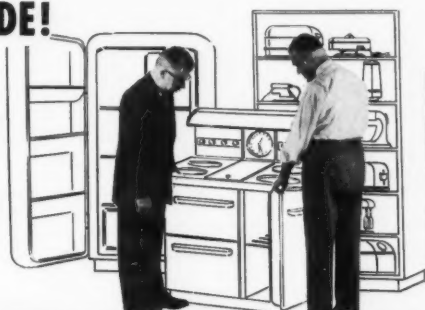
Molon Motor and Coil Corp.

3737 INDUSTRIAL AVE., ROLLING MEADOWS, ILLINOIS

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YOU'VE GOT IT MADE!

How did you get
exactly enough pressure
to keep it in place
with all of this movement?



Easy!

SPRINGS ... DESIGNED BY STANLEY
... TO FIT YOUR SPECIAL NEEDS



A STANLEY SPRING DESIGNED BY THEIR STAFF!

"Remember, Stanley Spring Manufacturing Company has one of the most modern stamping, wire forming and spring manufacturing plants in the entire Midwest.

"But, just as important, and more so to us, is this fact. They have an engineering department and tool and die shop that is second to none. They have the experience to come up with the layout, the suggestion for just the right spring or metal stamping to do the job.

"And, because of the vast variety of equipment available in the Stanley Spring plant, they are able to work with diameters up to ... and with all types of metals, in all hardnesses.

"Stanley serves some of the largest and finest producers and manufacturers of equipment and appliances ... the kind of products that require close tolerance and precision.

"The experience available at Stanley Spring Manufacturing Company ... plus ... their desire to serve their customers a little better ... a little faster ... means that all of this experience and equipment is at our command.

"The result is a spring or metal stamping produced especially for us ... when we need ... to solve our particular problem.

"Service ... fast as flying ... is the watch-word at Stanley Spring.

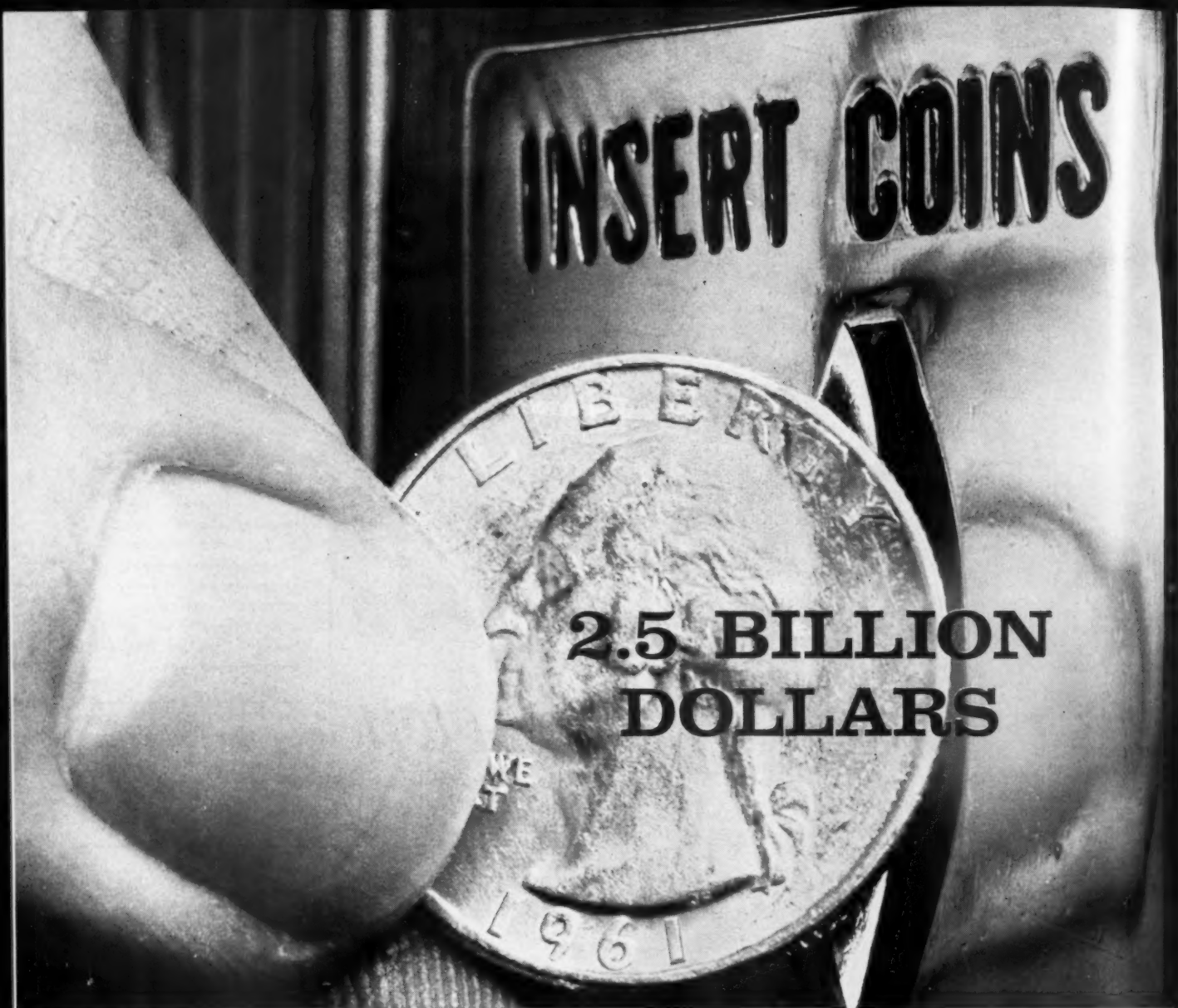
"Call us for any of the short run test metal stampings, springs or wire forms you may need. Or, to help you with any particular problem.

"You'll find the Stanley Spring engineering staff is always ready ... willing ... and able to be of help and assistance to you."

STANLEY SPRING MFG. CO.

5050 W. FOSTER AVE. • CHICAGO 30, ILL. • Spring 7-2400
METAL STAMPINGS • SPRINGS • WIRE FORMS

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\$2.5 BILLION worth of merchandise was sold through vending machines in 1960. National Rejectors, the world's largest and most experienced manufacturer of modern coin-handling mechanisms, plays a vital part in this explosive expansion of vending.



NATIONAL REJECTORS, INC. • ST. LOUIS 15, MISSOURI
OFFICES IN PRINCIPAL CITIES

A Subsidiary of Universal Match Corporation

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Kaiser West Virginia plant coats coil 66 inches wide

recently installed line handles aluminum
strip at speeds up to 100 feet per minute

EDITOR'S NOTE: This short feature describes what is believed to be the largest strip coating installation in the world. We felt it would be an interesting follow up to two recent MPM articles in which this subject was fully explored: "Strip Coating Techniques," August 1960; and "New Strip Coating Line for Aluminum and Steel," March 1961.

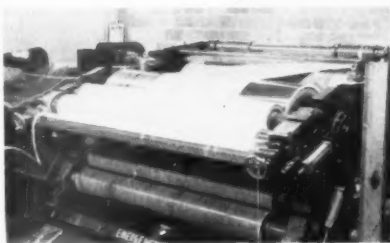
A NEW LINE for coating aluminum strip in widths up to 66 inches is now in operation at the Ravenswood, W. Va., plant of The Kaiser Aluminum & Chemical Corp. It is believed to be the world's widest strip coating line.

The equipment, most of which was supplied by the Waldron-Hartig and J. O. Ross Engineering Divisions of Midland-Ross Corp., operates at speeds up to 100 fpm, painting both sides of the strip simultaneously. One side may be painted one color while the other is painted another.

A two-spindle turret uncoiler is at the head of the line. Each of the two coils, one in process and one standby coil, is supported by expanding mandrels which extend into both ends of the coil. Hydraulically operated mandrels are utilized to adjust the mandrels to accommodate various widths of strip and to center the strip for processing.

Following the uncoiler is a feed-roll stand which guides the unwinding strip into the line. This unit also serves as an advancing mechanism when advancing strip into the line prior to stitching two coils together.

A set of edge flattening rolls which



Coater applying paint to strip. Strip passes over a second applicator roll on the opposite side of machine for coating the underside.

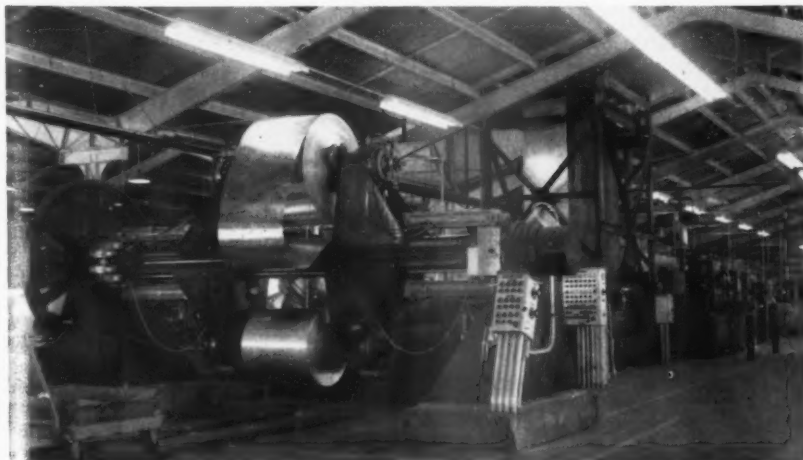
flatten burrs and other edge irregularities follows the stitcher. Next in line is an entry accumulator and a lead-in roll stand which establishes a pass line height for entering the metal cleaning and preparation machine.

The strip then enters a 90-foot-long unit which houses the five-stage metal preparation equipment. Immersion pumps mounted above the tanks recirculate the solutions into the piping system through which it is sprayed onto the strip. Throttling valves regulate pressures to spray headers.

Metal preparation solutions are heated

TO PAGE 63 →

View of strip coating line from unwind end. Unit feeds coating line from lower coil. Upper coil will be threaded into the line for uninterrupted processing when the lower coil is depleted.



THE MAGNUS METHOD

For more than 40 years, Magnus Chemical Company has maintained its leadership in the cleaning field by offering this unique time-and-cost-cutting combination:

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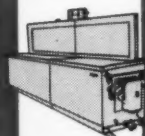
Over 300



Magnus produces a complete line of specialized chemicals — formulated to work independently in solving your cleaning problems or in perfect combination with:

CLEANING EQUIPMENT

Over 100 Types



Magnus also manufactures more than 100 types of automatic and semi-automatic cleaning machines, each designed specifically to work with Magnus chemicals to produce better cleaning results at lower cost.

CLEANING METHODS

World-Wide Representation



Because of its complete selection of chemicals and equipment, Magnus Sales-Service Representatives are free to recommend the method best for you... modern methods to meet modern problems.

SEND FOR FREE SURVEY FORM

Magnus will assess your cleaning operation — without obligation — and show you how to cut costs and speed production in your individual shop.

magnus
Chemical Co., Inc.
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Please send FREE information on Magnus time-and-cost-cutting cleaning methods.

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Engineered Metal Shapes



Roll Formed engineered shapes offer the distinct advantages of punching, notching, embossing and cutting to exact length in one continuous operation. You get the precise shape that's right for your product delivered to meet your production schedule.

Check your requirements against Roll Formed Catalog 760. It shows how good shapes help produce better products at lower cost.



MAIN OFFICE AND PLANT
3758 OAKWOOD AVE., YOUNGSTOWN, OHIO

Circle No. 357 on Reader Service Card.

Kaiser coats coil

→ FROM PAGE 67

by indirect-fired gas burner units which can be individually removed for maintenance. Each burner unit is controlled by an indicating-type temperature controller having a sensitive temperature bulb within the tank.

After leaving the cleaning-and-preparation machine, both sides of the strip are dried by the impingement of high-velocity air from nozzle outlets in transverse air ducts above and below the strip. Cooling is provided by the Z-shaped path taken by the strip before entering the coating room.

In the coating room, the strip enters from beneath the floor and follows an S path around two large rolls to the applicator roll. The small-diameter applicator roll rotates in reverse direction to strip travel, and receives regulated amounts of paint from chrome-plated steel rolls. As the strip leaves the coater, its other side is painted by a second applicator roll.

Each roll in the coating heads is individually driven to permit variable speed operation and provide a wide range of coating weights. Applicator and pick up rolls drop out of position when a spliced section of strip is passing through the coater.

After coating, the strip travels approximately eight feet (for flash-off)

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Electroluminescent

→ FROM PAGE 47

immaculate, dust-free area for production. We have proved that this can be accomplished by a stringent housecleaning program and an air handling system where dust and fine lint particles can be removed by electrostatic methods. Tiny particles of dirt or lint will mar the physical and lighted appearance of the lamp and may also cause premature failure.

Due to the degree of cleanliness needed to produce a high quality EL lamp, employees must be equipped with dust-free clothing. Further, they must be taught cleanliness and careful handling of the lamps. This small extra effort has been proved to reap big dividends by sharply reducing manufacturing losses.

Although this article has dealt with the metal-based lamp, each of the four types listed can be easily automated for manufacturing. This fact, coupled with the rapidly growing electroluminescent market, leaves little doubt that this type of illumination, either by reasons of specialized applications or economics, will play a leading role in future illumination.



Spotlights on standards...

the four American Presidents, carved out of the mountainsides, set standards which contemporary "public servants" might well emulate. This scene is particularly awe-inspiring at dusk, spotlighted by Crouse-Hinds, manufacturers of industry's standards in special purpose lighting, explosion-proof electrical equipment enclosures, traffic control equipment, and world-famous condulets.

30 YEAR OLD MEAKER "AUTOMATIC" PLATES 65-70 TONS OF PRODUCTS EVERY EIGHT HOURS AT CROUSE-HINDS CO.

In operation for over 30 years, the MEAKER AUTOMATIC at Crouse-Hinds, Syracuse, New York, turns out 65-70 tons of zinc plated condulets every eight hours. What's more, no down time has been recorded in all these years as the fault of the machine.

Reports Mr. Floyd Quinn, Plating Foreman: "Our MEAKER was installed in 1929 to handle condulets up to $\frac{3}{8}$ " diameter. We have been processing from $\frac{3}{8}$ " up to 6" diameters for years, with no modification to the equipment." That's versatility!

No wonder Mr. Quinn adds: "If we were to install another automatic plater tomorrow, we'd insist on

a MEAKER with little change from the one we have."

MEAKER has been building automatic processing equipment for continuous or batch type metal finishing since 1899... from "compact-a-matic" units occupying minimum floor space and for limited production requirements—to the world's largest automatic plating installation which occupies over 180,000 square feet and produces $4\frac{1}{2}$ acres of plated surface every 16 hours.

Our catalog "WHEN TO AUTOMATE" will give you some valuable ideas for improving profits through automatic plating or metal finishing



THE MEAKER COMPANY

SUBSIDIARY OF  SEL-REX CORPORATION

Nutley 10, New Jersey

Factories and offices Chicago 50, Ill., Los Angeles, Cal. and Nutley 10, N. J.

Circle No. 335 on Reader Service Card.

Industry news

Kelvinator Forms Subsidiary

A new subsidiary company has been formed in Puerto Rico for the manufacture of Kelvinator home refrigerators, according to an announcement by American Motors President George Romney.

The new company is expected to enable American Motors' worldwide appliance subsidiary, Kelvinator International Corp., to quadruple its current sales volume in the Commonwealth of Puerto Rico and the Caribbean markets by the end of 1965.

Pilot production on a 10-cu-ft model is scheduled for June in the 22,000-sq-ft plant in Bayamon near San Juan.

Dictaphone Adds Facsimile Unit

Dictaphone Corp. has taken another step toward diversification in the business communications industry by entering the field of facsimile transmission and recording.

Lloyd M. Powell, president of Dictaphone, announced that the corporation will now distribute and service Datafax facsimile equipment made by Stewart-Warner Corp.'s Electronics Div. The agreement between the two firms is non-exclusive.

Burroughs Forms Subsidiary

Consolidation and expansion of Burroughs Corp. operations in Canada under a new subsidiary have been announced by Ray R. Eppert, president.

Burroughs Business Machines Ltd. brings together several marketing and manufacturing organizations which have been operating in Canada for many years. President of the new subsidiary is Joseph L. Rapmund, general manager of Burroughs marketing in Canada for 25 years.

Delco Builds New Test Lab

Delco Appliance Div., General Motors Corp., recently put into operation a laboratory for the development and testing of its new GM Delco 365 home conditioning equipment.

The Rochester, N. Y. facility occupies approximately 4000 sq ft and is designed for future expansion. It consists primarily of two adjacent test rooms, each approximately 30 by 20 ft, with one 30-ft side common to each. In addition, the rooms are moisture-proof, and outside walls are of concrete block.

Maytag Reports Successful Cost Reduction Program

High percentages of supervisors and employees of The Maytag Co. took a personal interest in their job security during 1960 through participation in cost reduction programs, according to a recent report.

A total of 93 percent of eligible supervisors submitted an average of over eight cost-reduction ideas each and 48 percent of eligible employees averaged more than two work-simplification ideas each during the past year.

Employee participation at Maytag during 1959, last year for which figures are available, was the highest reported among 235 member companies of the National Association of Suggestion Systems, the company reports.



George M. Umbreit (left), Maytag president, awards certificates to Harry L. Vance (center) and John A. Wert, who were named top supervisors for their cost reduction achievements in 1960. The company reports that supervisors' ideas which were installed at Maytag the past year resulted in an average cost saving of \$2,290.

Romney Gets Publishers' Award

American Motors President George Romney has been chosen by National Business Publications to receive the Silver Scepter Award. According to the association, the award "recognizes the marketing genius of American Motors' top executive in sustaining and expanding that organization's far-flung markets — through competitive utilization of a full marketing concept, backed by intelligent and effective use of business-publication advertising and promotion."

Ebco Forms Export Subsidiary

The Ebco Mfg. Co., Columbus, Ohio, manufacturers of Oasis electrical refrigeration appliances, has announced the formation of a subsidiary export marketing corporation. Known as Ebco Trading Corp., Ltd., the subsidiary will handle all sales and administrative transactions in the western hemisphere exclusive of the United States.

Vibrocrafter Forms Sales Arms

Burgess Vibrocrafter, Inc., Grayslake, Ill., manufacturer of electric appliances and tools, has established two separate sales divisions to specialize its operations in the commercial and consumer markets.

The Commercial Products Div. will handle sales to industrial and commercial outlets. Products include the company's furnace humidifier, commercial electric can opener, built-in can opener, Bantam sprayer, and industrial Vibro-Graver tool.

The Consumer Products Div. will handle the bulk of the company's products, and will be composed of four departments: trade sales, special sales, premium sales, and export sales.

Caloric Moves Offices

Effective April 1, Caloric Appliance Corp. is moving its executive offices to Wyncote House in Wyncote, Pa., according to Julius Klein, Caloric president. The offices had previously been in Jenkintown, Pa.

The new offices will be headquarters for Caloric executive personnel and for the firm's sales, advertising and customer relations departments.

Ducted Electric Heating Promoted by Mueller

Mueller Climatrol has developed and tested a program for electric utilities to promote the use and benefits of a ducted electric heating system. The program, which has been field tested in three cities, has been turned over to Mueller sales representatives in all parts of the nation to help inform utilities of the advantages of a ducted electric heating system.

Temco to Build Coin-Op Washer

The Temco Industrial Div. of Temco Electronics and Missiles Co., a subsidiary of Ling-Temco Electronics, Inc., has acquired the manufacturing rights as well as the tools, dies and production equipment from Forzeo Mfg. Corp. for the automatic, coin-operated 20-lb washer, Model FZ-4.

The Zeolux Corp., New York, has been the exclusive national distributor for the "double-loader," under its own trademark, "Launderama," and will continue in the same capacity for Temco Industrial, according to Leon Mason, division manager of Temco Industrial.

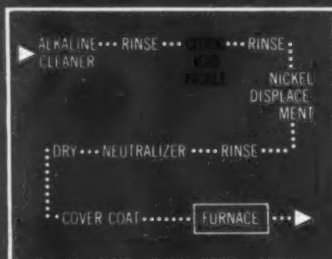
Extensive production facilities were prepared and allocated to the Launderama manufacturing operation at the

FOR DIRECT-ON PORCELAIN ENAMELING CHOOSE

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EASIEST ONE-COAT PROCESS OF ALL

□ Now, produce excellent, one-coat porcelain enamel finishes on metal surfaces. Your present equipment, only slightly modified, can bring you the advantages of an effective new direct-on development. □ Consider these features of the CITROBOND Process: **1.** Simply use citric acid in place of sulfuric acid in the pickling bath **2.** Dry, non-toxic, water-soluble, easy-to-handle Pfizer Citric Acid prepares the metal in a way that makes a ground coat unnecessary **3.** No major installation of special equipment is required **4.** Non-premium type steels can be used **5.** Excellent results are obtained with new low carbon steels □ Let Pfizer send you all the information about this modern enameling technique. Clip and mail the convenient coupon now.



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*Process developed by W. G. Ray, Chas. Pfizer & Co., Inc. and Shipp C. Davis, Daco Corp.

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Science for the world's well-being
Pfizer
CHEMICAL DIVISION

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PRECISION

**IS STANDARD
PRACTICE AT
KING-SEELEY**

PRECISION at King-Seeley is basic policy—a common denominator of all engineering, manufacturing and inspection. It is the reason for the enviable performance and service reliability by which K-S products have come to be known throughout the automotive and appliance industries.



**KING-SEELEY
DIVISION**
OF
KING-SEELEY THERMOS CO.
ANN ARBOR, MICHIGAN

AUTOMOTIVE

Forty years ago the first practical gasoline gauge for automobiles was introduced by King-Seeley—the hydrostatic "Telegage." Later came the transition to the more precise and dependable all-electric gauge system—another K-S achievement.



The precision, reliability and flexibility of the K-S engine-speed governor have won it top preference with motor truck manufacturers.

APPLIANCE CONTROLS

Rapid progress in Appliance Controls started six years ago when King-Seeley introduced the first built-in electric meat thermometer to eliminate the stoop-and-squint routine in oven roasting. Next King-Seeley provided the two-pointer signalling type unit.



The newest all-electric Roast Control by King-Seeley assures any selected degree of doneness regardless of how long actual serving time is delayed.

The new Chef-O-Matic surface element temperature control has taken all the guesswork out of top-side warming, boiling and frying.

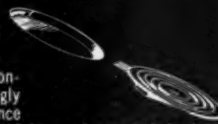
These have added progressively greater precision and automaticity to the art of cooking.

YOUR NEW APPROACH TO THE CONTROL QUESTION

There can be little question of control functions becoming increasingly important as a factor in appliance sales—hence the aggressive drive right now for controls having greater market appeal.

King-Seeley is continuing its expansion and development of appliance controls. New dryer and oven controls are being developed now. May we work with you on new Precision control systems?

Investigate with King-Seeley before programming your new models. You may save considerable time and avoid expensive headaches by turning your control problems over to us.



Circle No. 327 on Reader Service Card.

Temco Industrial main plant in Dallas. By late May production is expected to reach the rate of 50 washers per day.

For what is said to be the first time in washer design, the Lauderama features a "Monitor Top" which contains the drive motor, timer, water level control, drain valve, spin solenoid, water fill valve and all switches. This unit is located on the top of the machine to increase the speed and ease of servicing.

Architectural Metal Panel To Discuss Metal Finishing

A three-man panel discussion on "Finishes for Non-Ferrous Metals" will be sponsored by the Non-Ferrous Div. of the National Association of Architectural Metal Manufacturers, April 12 in the Terrace Room of the Plaza Hotel, New York City.

Members of the panel are Henry E. Voegeli, development engineer with the Anaconda American Brass Co.; Kenneth A. Matticks, manager, customer technical services, Crucible Steel Co. of America; and Russell V. Vanden Berg, manager, finishes division, Aluminum Co. of America.

The discussion will be part of the 23rd annual convention of NAAMM, being held April 9-14 at the Plaza Hotel.

Norge builds first thermoelectric refrigerator-freezer for commercial sale



Model demonstrates Norge thermoelectric refrigerator-freezer which will be used in a new Chicago hotel.

An order for 500 thermoelectric refrigerator-freezers has been placed with Norge by the Sheraton Corp. of America. The units will be installed in rooms of a new Sheraton-Chicago Hotel, which is scheduled for opening in Chicago in May.

Judson S. Sayre, Norge chairman, and Robert L. Moore, chairman of the 58-hotel chain, called the development a major engineering breakthrough, saying it opened a "whole new era in refrigeration."

Sayre called the new unit the forerunner of a home refrigerator without a mechanical compressor or refrigerant fluid. He estimated it would take from three to five years to bring this type of unit into the home, following application in hospitals, medical centers, boats, and doctors' or dentists' offices.

Beside its scientific importance, Sayre declared the development a "psychological victory for the appliance industry," whose sales in 1960 sagged from 10 to 15 percent.

The dissimilar metals used in the Norge unit to take advantage of the thermoelectric effect are alloys composed



Union Roller Coater applies drawing compounds at KAISER ALUMINUM

At the Ravenswood Works, Kaiser Aluminum & Chemical Corporation, Ravenswood, West Virginia, a Union 26" No. 5 Roller Coater gives top performance coating sheet aluminum prior to drawing. Union Roller Coaters are at work everywhere, applying drawing compounds, adhesives, paint . . . any fluid substance . . . to metal, plastic, wood, rubber, paper, fabric. Models to handle sheets from 6" to 108" wide, variable thicknesses, coating one or both sides, either or both edges, continuously or intermittently, automatically. What's your coating problem? Write today!

929 North Detroit Street



THE
UNION TOOL CORPORATION
WARSAW, INDIANA

Circle No. 364 on Reader Service Card.



JACK NUT

The Only Blind Fastener Which Grips Any Material From 0" To 3/4" Thick

The Jack Nut cuts cost, speeds assembly, solves hitherto impossible fastening problems. Can be used as a rivet and/or blind fastener. It's versatile, easy to use and no special tools are needed.

The only blind fastener with threads which grips any material from 0" to 3/4" thick. Needs only 3/8" expansion space. Allows holes to be fashioned before, during or after fabrication. Hole size is not critical and special type of hole is not necessary.

Made of quality steel, cadmium-plated. Grips evenly on rough as well as smooth surfaces. Provides vibration-proof assembly. Weight-carrying capacity is limited in most cases only by strength of the material in which used.

Sold By Wholesale Hardware, Electrical Wholesale & Industrial Supply Distributors

MOLLY CORP.
245 N. 5th St., Reading, Pa.

EASY TO INSTALL

- 1 Insert Jack Nut into hole. Needs only 3/8" expansion space.
- 2 Run in screw to collapse spider anchor backing by exerting pull on thread.
- 3 Jack Nut now is installed and ready to receive attachment screw.

SPECIFICATIONS

CAT. NO.	CAP. DIA.	CAP. THICK.	BODY DIA.	O'ALL L'GTH.	THREAD	MAX. SPREAD
4-S, JN	15/32	3/64	9/32	9/16	6-32	43/64
4-L, JN	15/32	3/64	9/32	3/4	6-32	43/64
* 6-S, JN	17/32	1/16	3/8	11/16	10-24	25/32
* 8-S, JN	5/8	1/16	27/64	3/4	1/2"-20	13/16

S for 0" to 3/4"; L for 3/4" to 3/2"
 * 8-32 & 10-32 threads available
 ** 10-24 & 12-24 threads available
 NOTE: 4-S, JN & 6-S, JN also available in brass

Circle No. 341 on Reader Service Card.

of bismuth and telurium, plus smaller amounts of an impurity element. The unit has three "modules," each containing eight positive and eight negative elements.

The refrigerating system of the Norge thermoelectric refrigerator-freezer consists of a primary ac electric power supply and a secondary dc rectifier unit. Current is transmitted from an ordinary 115-volt appliance outlet through a three-ampere fuse to an on-and-defrost switch. A pilot lamp lights when the machine is in operation.

A 10-watt air circulating fan cools the hot junction fins, and a thermostatic safety cutout switch protects the thermoelectric device from harm due to accidental overheating. The 115-volt current then passes through the primary side of the transformer and by induction creates a 5½-volt ac flow through the secondary side of the system.

The heat pumping action of the thermocouples begins when a constant flow of low voltage direct current passes through them. The direct current is obtained by passing the low voltage ac through a series of silicone rectifiers, and the uniform voltage is controlled by means of a filter choke.

The current, then passing through the thermoelectric module assembly, creates a heat pumping action, meaning, that heat contained within an insulated enclosure is literally pumped or transferred from that area through the thermocouples to the hot junction plate and radiating fins where it is dissipated into the surrounding atmosphere.

New PMI Officials



MPM PHOTO

As part of a recent "inspection tour," Jefferson D. Keith (left) and Marion Sherwood attended a meeting of the Chicago Chapter of the Pressed Metal Institute. Keith was recently appointed PMI managing director, and Sherwood, president of Grand Haven Stampings, Inc., Grand Haven, Mich., is the association's new president.

NEMA Announces First West Coast Conference

The National Electrical Manufacturers Association will hold its first Western Conference at The Biltmore Hotel, Los Angeles, June 8 and 9.

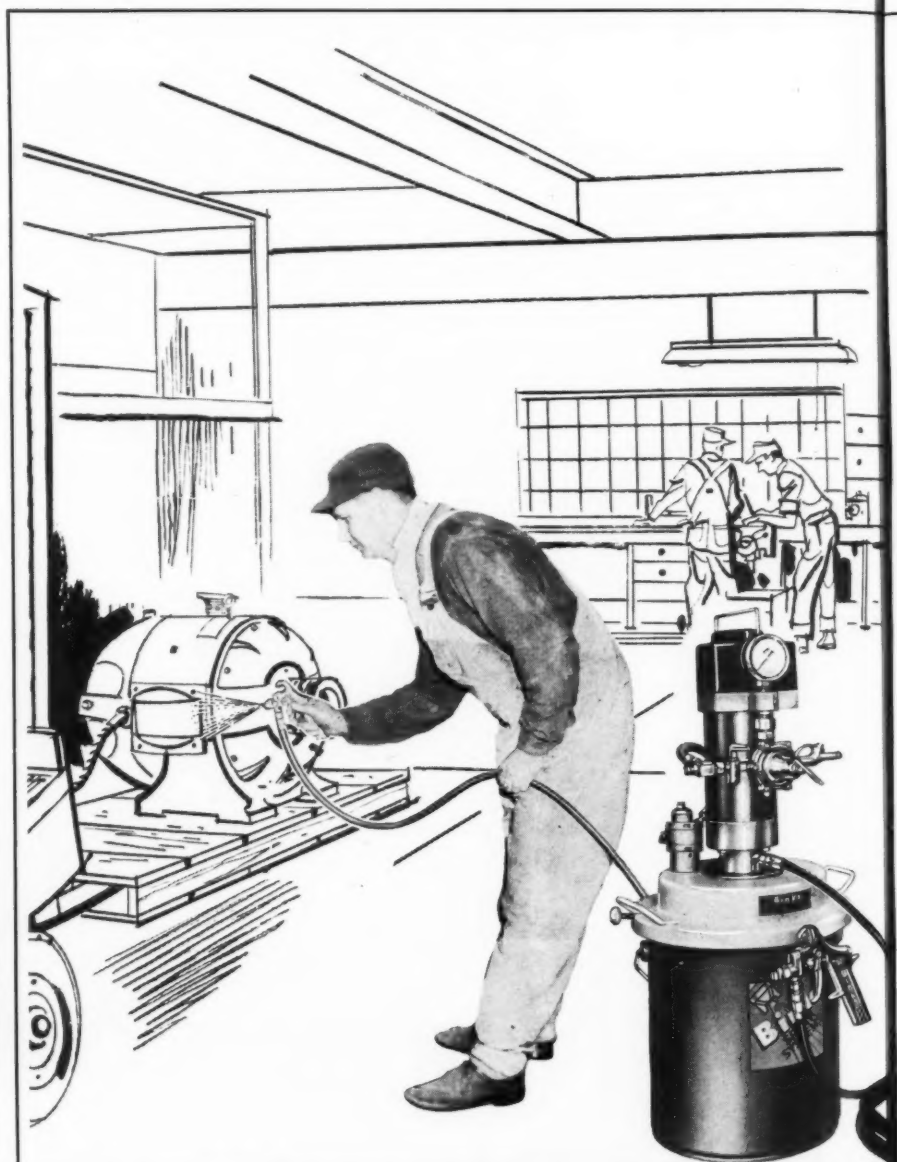
The conference is planned primarily for member companies located in states west of the Rocky Mountains and for western representatives of members headquartered in other sections of the country. However, representatives of all member companies have been invited to attend.

A general meeting is planned for the first afternoon with authorities in and

outside the industry discussing such subjects as world markets for electrical products, research and development, effects of imports on the electrical industry, and business trends today and tomorrow.

NEMA also announced a meeting of the Consumer Products Div., April 20-22, in Boca Raton, Fla.

In other NEMA developments, the formation of a new section to deal with unconventional power generation was recently announced. The scope of the new Unconventional Power Generation Section includes: magnetohydrodynamics (MHD), fuel cells, thermoelectrics, thermionics, batteries, photovoltaics and photochemicals.



Binks Everything for spray painting

AHLMA Announces Program for Annual Convention at Boca Raton

Top executives of six major appliance manufacturers headline the program for the American Home Laundry Manufacturers' Association 1961 convention, April 16-18, Boca Raton, Fla.

The executives are presidents Robert E. Brooker, Whirlpool, and James M. Skinner, Jr., Philco; H. W. Dennler, general manager, major appliance division, General Electric; John W. Craig, vice president and general manager, major appliance division, Westinghouse; Homer L. Travis, vice president, Kelvinator Sales; and Claire G. Ely, vice president, marketing, The Maytag Co.

Brooker will discuss "Profit Planning for the Laundry Industry" during the general convention business session titled, "A Resurvey of the Sixties." He will point out that historically, as a product ages and market saturation increases, profit potential decreases. How this will affect the laundry industry and how sound management planning, control of production and marketing, and long-range planning can significantly arrest profit erosion will be his underlying theme.

President Skinner of Philco, speaking on "World-Wide Perspective for the Ap-

pliance Industry," will review factors involved in comparing home laundry appliance export sales with total production. He will explore the immediate future growth potential of appliances in the overall world market.

Ferro Survey Reports Public

Ready for Changes in Homes

According to John R. McCord, director of marketing for Ferro Corp., the public is ready for new home building materials and designs.

The company has just released the results of a survey of more than 1200 persons who visited the firm's research house last year in a Cleveland suburb. The house was erected by Ferro in cooperation with a group of some 20 major manufacturers of building materials and components to serve as a problem-solving structure for a wide variety of new products and building techniques. The house attracted more than 15,000 visitors.

"The public reaction to the research house as a whole is very enthusiastic," McCord says. "Every major feature had good acceptance, and only a few features were less enthusiastically received than others. The number of negative ratings for any feature never begins to approach the total positive ratings."

IAM in New Quarters

The Institute of Appliance Manufacturers and its publication, *Home Appliance Builder*, have moved their offices to a new building in the trade association center of Washington, D.C.

The Institute simultaneously announced the availability of a special management service to members of the major appliance industry in connection with governmental contracts, marketing research, patents, labor relations and direct mail. These services are already available to Institute members and are now being offered on a fee basis to non-members.

ACS Enamel Div. Program Set

The American Ceramic Society will hold its 63rd annual meeting April 23-27 at Toronto, Ontario, Canada.

The advance program for the Enamel Div. includes a paper on metal cleaning by Harold C. Wilson, Vitreous Steel Products Co.; a discussion of phosphoric acid pickling for one coat enameling by Evan M. Oliver, General Electric Co., Range Dept.; a paper on one coat enameling "with an intermediate catalyst film" by J. D. Sullivan, A. O. Smith Corp., information on flame-sprayed

TO PAGE 78 →

New COMPACT airless spraying outfit

...an "extra" man for your
odd jobs around the shop

New, economy model airless outfit... small enough to carry anywhere in the plant... large enough for a variety of maintenance jobs. Apply paint with minimum overspray, maximum coverage... paint goes where you want it... on the surface, not into the air. Result: considerable material savings.

All metal surfaces of the airless outfit, exposed to spraying materials, are tough, non-corrosive stainless steel... ideal for indoor or outdoor use.

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Arvin has added new wide coil facilities—36" and over—to its narrow coil and sheet facilities. This addition makes Arvin the only source for coil and sheet laminates as well as fabricated Arvinyl stampings and assemblies.



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High Production
Speeds



Exterior surface of
vinyl unmarred by
weld. Vinyl doesn't
have to be ground
away before welding!



An excellent weld
when assembly of
trim or other com-
ponent parts hide the
point of welding.

Arvin Offers A Complete Service From Designer's Sketch To Finished Product

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ARVIN INDUSTRIES, INC. • Columbus, Indiana
Arvinyl Division

America's
largest vinyl
metal laminator

Circle No. 305 on Reader Service Card.

TECHNICAL PROGRAM

12TH ANNUAL NATIONAL APPLIANCE TECHNICAL CONFERENCE

May 1, 2 & 3

Louisville, Kentucky

MONDAY, MAY 1

- LEAKAGE CURRENTS IN APPLIANCE HEATERS
A. F. Boice, General Electric Industrial Heating Dept.
- DOUBLE INSULATION
D. C. Krammes, The Hoover Co.
- IMPROVING MOISTURE AND WATER RESISTANCE —
COMPRESSOR MOTOR FEED-THROUGH TERMINALS
G. B. Helmen and J. B. Kelley, Westinghouse Electric Corp.
- 240 VOLT TO GROUND — RESIDENTIAL UTILIZATION
R. F. Lawrence, Westinghouse Electric Corp.
- RESIDENTIAL UTILIZATION VOLTAGES
H. E. Campbell, General Electric Co., Schenectady, N. Y.
- FACTORS AFFECTING THE DESIGN OF RELIABLE ELEC-
TRICAL CONTACTS
Dr. M. Oliver, AMP

TUESDAY, MAY 2

- THERMOSTATIC BIMETALS
C. Zeigler, W. M. Chace Co.
- COMPONENT RELIABILITY
R. L. Heckman, General Electric Appliance Controls Dept.
- TEMPERATURE CORRELATION BETWEEN CUSTOMER AND
SUPPLIER FOR DISC THERMOSTATS
E. C. Ballard, Texas Instruments
- ACOUSTICAL TESTING OF MUFFLERS FOR REFRIGERA-
TION SYSTEMS
J. L. Martin, Whirlpool Corp.
- FACETS OF APPLIANCE NOISE CONTROL
A. L. Martin and A. F. Martz, Whirlpool Corp.

WEDNESDAY, MAY 3

- CABLE HEATERS
C. H. Witsken, Welcraft Products
- THE DECOMPOSITION OF CHLORINE BLEACH IN
WASHING
L. Loeb, General Electric Major Appliance Div.
- HEAT PUMP DE-ICING CONTROL
T. I. Syfert, Ranco, Inc.
- THERMAL ELECTRICAL — A METHOD OF CALCULATING
THERMAL ELECTRICITY REQUIREMENTS
J. A. Pietsch, General Electric Major Appliance Div.
- STUDIES ON SLIME FORMATION IN A CASCADE-TYPE
HUMIDIFIER
N. G. Roth, Whirlpool Corp.

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to tell you it's
worry-proofed
at the factory



Other spring fasteners may look like Tinnerman SPEED NUTS. But only the *T-marked* ones really are SPEED NUTS... really are "Tinnermans"... made to highest quality and precision standards to assure worry-proof performance on your assembly.

Here's what the exclusive Tinnerman T-mark means to fastener users:

Over thirty-five years of Tinnerman experience as the originator and largest producer of spring-steel fasteners...the leader in solving your fastening problems,

Outstanding fastener design and production experi-

ence that assures you the best possible design of SPEED NUT, whether it is a special SPEED NUT or one of the 10,000 SPEED NUT brand fasteners presently available,

Stringent control of SPEED NUT quality from coil strip to you, including die design, production, heat treatment and finishing.

Be sure you specify "Tinnerman T-marked SPEED NUTS" that give you better fastening, that cut parts and assembly costs, that never let you or your customer down. *Tinnerman Products, Inc., Dept. 12, Box 6688, Cleveland 1, Ohio.*



Circle No. 361 on Reader Service Card.

Industry news

→ FROM PAGE 75

ceramic coatings by T. Vasilos and G. Harris, Avco Corp. (Wilmington, Mass.); and a discussion of the determination of physical properties of flame sprayed ceramic coatings by Jerald L. Bliton and Harold L. Rechter, Armour Research Foundation.

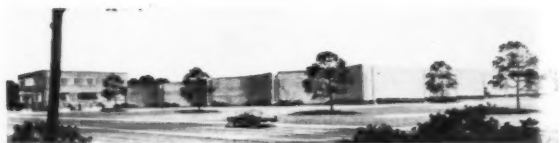
A total of 19 papers is listed in the advance program released by The American Ceramic Society, Columbus, Ohio.

\$1 Million Sales in First Day

American Laundry Machinery Industries, Cincinnati, has reported that sales of its Econ-O-Wash coin-operated dry cleaner totaled \$1 million the first day it was unveiled at the recent National Institute of Drycleaning show in Philadelphia.

Lux Enlarges Tennessee Plant

Artist's conception of 54,000-sq-ft addition now under construction at the Lebanon, Tenn., factory of The Lux Clock Mfg. Co. The expansion will double the size of the existing plant. All assembly work on the company's lines of range, washer and dryer and other timers, as well as all alarm clocks, will be handled in the expanded plant. The present work force of 208 will be expanded to 425 by June.



Admiral to Lease Appliances

The Commercial Electronics Div., Admiral Sales Corp., has announced plans to lease appliances to apartment house operators. Larry L. Malin, vice president of the division, said that the company is now offering its electric refrigerators, room air conditioners, free-standing and built-in electric ranges and dishwashers to apartment owners throughout the U.S.

Product Demand Trends Studied

An insight into product demand trends of the future will be made possible soon through a data development program which provides a wealth of statistics to researchers. The first portion of the study will be available by June.

The work is being done by the Data Processing Div., S. J. Tesauro & Co., Detroit, on a Remington Rand Univac solid-state computer. The project pinpoints sociological trends, changing economic currents, shifts in population between urban areas and between farms or suburbs and cities.

According to S. J. Tesauro, president of the data processing organization, the project will provide a basis for accurate and timely projections dealing with future demands on the educational system, recreations facility requirements, population trends, and specific needs for goods and services on the part of the public.

The tabulations will be completed by the fall of this year, and will be available at nominal cost.

NEMA Housewares Section Launches Utility Promotion

The Electric Housewares Section of the National Electrical Manufacturers Association has launched its 12th consecutive year of nationwide, industry-wide promotion with its annual Valentine's Day Party for the trade and consumer press.

The overall theme of the 1961 promotion is: "Electric Housewares are Helping Hands . . . Give Her Another Helping Hand Soon!"

Design Engineering Show Moves to Detroit's Cobo Hall

The Design Engineering Show, taking advantage of the opening of Cobo Hall, will move to Detroit for the first time in 1961. The exposition and the concurrent conference will take place May 22-25.

The machine design division of the American Society of Mechanical Engineers will sponsor the conference for the sixth consecutive year.

VERSATILE "PRODUCTION-PROVEN" FINISHING EQUIPMENT from MURRAY-WAY

DIAL TABLE—built to fit your exact requirements.

#55 HEAD—compact, rugged, multi-position polishing and buffing head. Operates right or left.

INDEXING CONVEYOR—incorporates exclusive Murray-Way indexing or continuous features.

EDGE GRINDER—for precision grinding of products such as floor tile.

Murray-Way offers a complete line of standardized, economical finishing equipment for both large and small shops. In addition, experienced Murray-Way production engineers, working with the finest manufacturing facilities available, will gladly help with your specialized production problems.

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Circle No. 343 on Reader Service Card.

MPM

new industrial literature

PRECISION INDUSTRIAL FASTENERS

An eight-page condensed bulletin offered by Standard Pressed Steel Co. describes the company's line of standard precision industrial fasteners, including socket screw products, pressure plugs, locknuts, spring pins, dowel pins and steel collars. The bulletin details basic data on types, sizes, threads and plating, and spells out design features and application techniques.

Circle No. 116 on Reader Service Card.

PERFORATED METAL LITERATURE

A general catalog and a stock list brochure on perforated metals are available from Harrington & King Perforating Co., Inc. Illustrated is the line of patterns available in contemporary and traditional designs, all of which are available in steel sheets for shipment from stock.

Also described is a selection of additional patterns and open areas which can be custom fabricated from existing dies.

Circle No. 117 on Reader Service Card.

ELECTROSTATIC MOVING BELLS

Ransburg Electro-Coating Corp. is offering a brochure on its electrostatic moving bell finishing equipment. The brochure explains, among other things, how limit switches reposition the reciprocating bells to accommodate various parts mixed on the same finishing line.

Circle No. 118 on Reader Service Card.

NUT AND BOLT STRENGTH

A fundamental explanation of the different kinds of strengths involved in metal bolts and nuts, plus a description of how these strengths are achieved is covered in a 14-page booklet by The H. M. Harper Co.

The booklet, "Inside Story of Greater Strength; Shaping Metals That Shape Your Future," offers engineers and designers clear definitions of such terms as shear strength, tensile strength, stress corrosion, creep strength, thread strength and metal fatigue. Production techniques involved in producing consistently strong bolts and nuts are also covered.

Circle No. 119 on Reader Service Card.

INFRA-RED OVENS

An eight-page folder of fused quartz radiant ovens has been released by The Cleveland Process Corp. The folder is illustrated with on-the-job applications as well as line drawings, graphs and charts.

Circle No. 120 on Reader Service Card.

RIVET BROCHURE

Advantages of using Cherry Commercial rivets for fast, secure and economical fastening in blind or open applications are described in a new, 12-page booklet available from Townsend Co.'s Cherry Rivet Div.

The brochure contains specifications for

rivets in plugged and hollow types, which are available in aluminum, mild steel and monel. A series of charts, drawings and photographs covers such topics as how to choose the right rivet for the job, recommendations on drill hole size and material thickness. An application tool guide covers three powered and three hand-actuated rivet setting guns.

Circle No. 121 on Reader Service Card.

RESET COUNTING DEVICES

Multiple-unit reset counting devices which are said to provide time and labor savings by replacing manual tabulation in a number of applications are the subject of a four-page bulletin now being offered by Veeder-Root, Inc.

Descriptions and photographs indicate uses of these mechanical counters, marketed under the name "Vary-Tally," general information, specifications, and design features are included.

Circle No. 122 on Reader Service Card.

BARREL PLATING EQUIPMENT

Modern, multi-use barrel plating equipment is described in a 16-page booklet offered by The Udylyte Corp. Major plating barrel specifications augment 38 photographs and recommendations for barrel assemblies, horizontal barrel units, loading stands, storage and transfer units and final rinse units. Automatic machines, centrifugal dryers, heating and cooling coils, tank linings and rectifiers are discussed.

Circle No. 123 on Reader Service Card.

CROWNED ABRASIVE MATERIAL

Nu-Matic Grinders, Inc. announces new literature describing a new development in the use of crowned abrasive material on their Valcore inflated finishing wheels. According to the literature, the wheels permit effective use of the newest development in coated abrasives: resin-bonded bands that can be molded by the user to the desired degree of crown.

Circle No. 124 on Reader Service Card.

PRESSED METAL PRODUCTS

A new file-size catalog published by the Waterbury Pressed Metal Co. shows some of the company's contract manufacturing facilities and the various types of metal stampings and assemblies produced by them.

Illustrated are a variety of typical examples of progressive stampings, ribbon form stampings, eyelet stampings, single-operation stampings and stamped assemblies. The brochure also describes the company's engineering service for the design or redesign of metal parts.

Circle No. 125 on Reader Service Card.

ELECTRONIC INFORMATION SEARCHING

An eight-page brochure describes American Society for Metals' new electronic system of searching metallurgical and related literature for specific information on subjects.

The brochure discusses the mechanized way to reduce research costs and increase accuracy, speed and effectiveness, and shows how subscribers may receive, every

two weeks, information on anything published in the preceding two weeks in their field of interest.

Circle No. 126 on Reader Service Card.

BONDED LUBRICANT COATING

The characteristics of Molykote PVE, a new bonded lubricant coating for ferrous surfaces, are described in a new data sheet recently published by The Alpha-Molykote Corp. Originally compounded for use on cutting tools, the new molybdenum disulfide lubricant is said to be equally useful on heavily loaded ferrous bearing surfaces in all types of mechanisms.

In addition to giving full specifications for the new coating, the two-page, two-color bulletin includes data from actual tests of the material on metal cutting tools.

Circle No. 127 on Reader Service Card.

MULTI-GUN WELDERS

A new issue of "Tips and Dies," published by Federal Machine and Welder Co., describes and illustrates 14 multi-gun welders. Included in the coverage are types including single, two, and four-post models with toggle lift, direct lift, fixed bridge, tilt table and shuttle feed.

Circle No. 128 on Reader Service Card.

SPRING-TENSION FASTENERS

A new brochure published by Associated Spring Corp. summarizes its various classes of spring-tension fasteners. Illustrations show customized designs for clamps, clips, latches and locks, pins, retainers, snap rings, hooks and holders, catches, spring washers, hangers and collars. Case history examples demonstrate how spring-like flat stampings can simplify design, cut cost and improve reliability.

Circle No. 129 on Reader Service Card.

ULTRASONIC CLEANING EQUIPMENT

Availability of an eight-page, illustrated catalog describing ultrasonic cleaning applications and equipment has been announced by Phillips Mfg. Co. The catalog explains in detail the descriptions and features of tank transducers and ultrasonic generators for use in large and small scale degreasing operations.

Circle No. 130 on Reader Service Card.

STANDARD COATED ABRASIVES

"Catalog of National Standard Abrasive Belts, Rolls, Sheets and Discs," published by Carborundum's Coated Abrasives Div., lists standard coated abrasive products used throughout industry. All items listed are maintained in stock at Carborundum warehouses.

Circle No. 131 on Reader Service Card.

CERAMIC MILL JARS

A line of metal-jacketed ceramic laboratory mill jars manufactured by McDanel Refractory Porcelain Co. is described in recently published literature. The jars are available in quart, gallon and two-gallon sizes, and are said to be easy to discharge and clean.

Circle No. 132 on Reader Service Card.



COMPLETE PAINT FINISHING SYSTEMS

...from automobiles, to appliances, to office machines, ROSS PAINT FINISHING SYSTEMS handle everything. METAL CLEANING through DRY-OFF on to SPRAY BOOTH into SOLVENT VAPOR ENCLOSURE to FLASH OFF into PRIME COAT BAKE OVEN on to FINISH COAT then to FINISH COAT BAKE OVEN into COOL on to INSPECTION.

The whole system is an engineered combination of the most modern ROSS components including metal preparation units, spray booths, flow coat units, dry-off ovens, air make-up units, air heaters, conveyors and air conditioning units. Now, a single responsibility for the entire system — engineered, designed, fabricated and erected by J. O. Ross Engineering. For more information send for Paint Finishing Bulletin No. PF 401.

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Circle No. 358 on Reader Service Card.

New literature

→ FROM PAGE 79

INDUSTRIAL EQUIPMENT CATALOG

A 12-page catalog (A661) issued by The R. C. Mahon Co. details the company's line of industrial equipment. Described and illustrated are metal cleaning and finishing equipment, processing ovens, special processing equipment, control components, dust and fume control equipment and engineering services.

Photos of actual installations of Mahon equipment are included, along with descriptive information and technical details.

Circle No. 133 on Reader Service Card.

SOLDERING AND BRAZING

A new brochure describing "economic automation processes" in soft soldering and silver brazing has been made available by Fusion Engineering.

The brochure describes a method of automating production soldering and brazing operations with paste alloys, describes briefly three series of paste materials available, and gives four case histories of cost savings achieved through use of the equipment.

Circle No. 134 on Reader Service Card.

PRODUCTION BENDING MACHINES

Pedrick Tool and Machine Co., Inc. has announced a new bulletin on their line of production bending machines using the compression method of bending. The bulletin discusses the various types of bending and the economics of bending. The various models of the company's benders are shown, with specifications and application recommendations for each.

Circle No. 135 on Reader Service Card.

ELECTROPOLISH MATERIAL

A liquid acid electropolish material that is said to work equally well on carbon steel, aluminum and stainless steel is fully described in a technical data sheet prepared by MacDermid, Inc. The data sheet contains detailed operating conditions, recommended equipment and cycle, and control procedure for the product.

Circle No. 136 on Reader Service Card.

CONNECTIONS IN WELDING

Electrical connections that run hot mean trouble for a welding system, according to a new bulletin, "Welding's Vital Links," published by J. B. Nottingham & Co.

Thirteen ways to judge the quality of welding system connections are listed. Electrically and mechanically, each connection should be equivalent of the cable it joins, the bulletin points out.

Circle No. 137 on Reader Service Card.

ASM METALS BROCHURE

A 32-page illustrated brochure describes a new, 1300-page ASM Handbook, 8th Edition, Vol. 1, "Properties and Selection of Metals." Actual examples from each of six major sections are presented, with documentary information on how the book was compiled by 1135 members of the American Society for Metals.

Circle No. 138 on Reader Service Card.

APRIL • 1961



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10% to 25%

on product
finishing.....
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with

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Better finish . . . at lower cost!

Cut metal product finishing costs as much as 10% to 25% by using steel or aluminum coils or sheets *already pre-coated* by Pre Finish Metals, Inc., specialists in applying custom-formulated finishes! Pre-coating also assures a more uniform, better quality, more durable finish for either functional or decorative use.

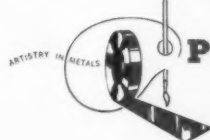
Stamp, draw, shape, bend, or form it!

Pre-coated metal actually aids fabricating operations in your plant! The finish acts as a lubricant for better flow of material—and longer die life. You also save on production costs, reduce space requirements, and add product sales appeal.

To meet your specifications!

Coatings are custom formulated and pre-tested to meet product fabricating and use requirements! Unlimited color variations, patterns, wood grains, and embossed designs are supplied in finishes ranging from organic coatings (organosols, plastisols, epoxies, acrylics, alkyds) to polyvinyl film laminates. *Supply your own metal or we will furnish.*

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SELL MORE**



● Everything to be said about quality, about reputation, about your company and your product is said best with La France die cast name plates and decorative trim. There can be no error. These three-dimensional name plates with cut-out letters speak out on the showroom floor. Here is positive product identification—manufactured by La France, the leading specialist in the field! Why not have an original design submitted with a quotation for your approval?

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Circle No. 329 on Reader Service Card.

MPM

personals

Caloric Appliance Corp. has announced four appointments at its Top-ton, Pa. plant. **William S. Fisher** was named assistant to the vice president of manufacturing. He will be responsible for plant layout and equipment design for Caloric and licensee companies. **Mel-bourn DeJarnett** was appointed department superintendent, porcelain enamel. He has been a shift supervisor in the porcelain enamel department.

In the Caloric research and develop-ment department, **Domenick Saponara** has been promoted to chief engineer, and **Robert Clark** has been named man-ager of the advanced design group. Saponara will supervise all activities of the engineering group, drafting group, and model shop, and Clark heads a newly-formed group responsible for origination and creation of advanced-design products.

Sharon Steel Corp. has advanced four persons to new positions within the company's sales organization. **James W. Byrne** has been named manager of market-ing hot rolled products; **Walter A. Garrett**, manager of marketing for Brainard Strapping; **Donald W. Meyer**, manager of marketing for cold finished and coated products; and **Rollin E. Douglas**, manager of marketing special coated steels.

C. J. Flynn, general service manager of the **Maytag Chicago Co.**, has been named assistant to the president. He will continue to have administrative respon-sibility over the service and parts depart-ment, but on a broader level, according to President T. G. Hearn.

George H. Fitch has been appointed general manager of the **Enamelstrip Corp.**, Allentown, Pa. Enamelstrip is a wholly-owned subsidiary of National Steel Corp. Before his recent appoint-ment, Fitch served as sales manager of organic products.

FLYNN



FITCH



CLARK



SAPONARA



DEJARNETT



FISHER

Howard S. Alliton has been appointed vice president and works manager for **Universal Electric Corp.**'s new Riply, Tenn. plant. He has been with the firm 14 years. The firm makes fractional horsepower motors.

L. F. McCue has been appointed gen-eral manager of **Drying Systems Co.**, Chicago, a subsidiary of Thor Power Tool Co.

Miss Helen A. Dawson has joined the **Westinghouse Home Economics Insti-tute**. She will be in charge of testing the company's electric housewares and other portable appliances under condi-tions similar to those in the average home, and will work with engineering, quality analysis and market research, as well as the sales department, in the development and marketing of new ap-pliances.

Richard W. Funk has been appointed legislative counsel for the **National Auto-matic Merchandising Association**. He will be assisted by **John Insalata**, assis-tant legislative counsel at the NAMA Chi-cago headquarters.



MISS DAWSON



FUNK

Charles Azzarello has been appointed sales promotion manager of **Binks Mfg. Co.**, Chicago. In addition to his normal sales promotion duties, he will work in the field with business and trade shows, industrial exhibits and sales clinics. He was formerly assistant sales manager of the company's St. Louis branch.

Dewey E. Holcombe has been ap-pointed director of field sales for **The Pfaudler Co.** Prior to assuming his new position, he was Pfaudler New York district sales manager for three years.

Gordon N. Gray, former vice presi-dent of **Bryant Mfg. Co.**, has been named vice president in charge of manufactur-ing of **Addison Products**, Addison, Mich., manufacturer of air conditioning equipment, ornamental shutters and steel folding doors.

Lee Clancy has been promoted to national sales manager of ironers for **Ironrite, Inc.** He was formerly advertis-ing and sales promotion manager. Iron-rite also announced the promotion of **Clay Armitage** to Clancy's former po-sition.



ARMITAGE



CLANCY

Alan Wood Steel Co. has announced three promotions in its marketing and sales organization. **J. Frederic Land** has been named assistant vice president, marketing; **William T. Haddon** was appointed general manager, steel sales; and **George G. Karian** was named gen-eral manager of the newly formed Iron Powder Div.

Wallace T. Rouse has been named manager of engineering for the Ft. At-kinson, Wis. residential lighting fixture manufacturing plant of **Thomas Indus-tries, Inc.**, Louisville, Ky. Until recently, he was associated with Hamilton Mfg. Co. as product development manager.

William A. Donahue has been named industrial sales manager for **Arno Ad-hesive Tapes, Inc.**, Michigan City, Ind. The firm produces adhesive tapes for industrial packaging, sealing, labeling and masking.

Robert G. Bein has joined the **Robert-shaw-Fulton Controls Co.** at its Rich-mond, Va. headquarters as market ana-



everyone agrees...

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*Low Temperature
Porcelain Enamel*

FRITS offer

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- ★ REDUCED FUEL COSTS ★ LONGER FURNACE LIFE ★ LOWER MAINTENANCE COSTS
- ★ FREEDOM FROM WARPAGE ★ LOW TOOL COSTS ★ IMPROVED COVERAGE
- ★ SAVINGS ON REFRACTORY BRICK ★ TOP QUALITY FINISHES ★ PRODUCTION COST SAVINGS WITH LIGHTER GAUGES—NON-PREMIUM METALS

These . . . and other advantages . . . are yours when you use O. Hommel "performance tested" Low Temperature porcelain enamel frits. Try them yourself and see how you'll be dollars ahead. Ask your Hommel representative to demonstrate these "years ahead", tried and proven frits . . . or write . . .

THE O. HOMMEL CO.

PITTSBURGH 30, PA.

MPM-461



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You are welcome at the Hommel Hospitality Suite in The Royal York during the 63rd Annual Meeting of the A.C.S.

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lyst. He will work under the direction of Arthur G. Baitz, corporate director of marketing. His services in the marketing field will also be available to the eight divisions of Robertshaw-Fulton in the United States, the company report states.

E. W. Detjen is now plant engineer at **Gilson Bros. Co.**, Fredonia, Wis., manufacturers of lawn mowers and rotary garden tillers. Detjen was formerly with **Stoelting Bros. Co.**, Kiel, Wis., manufacturers of dairy plant equipment and automatic cleaning and washing machinery.

Robert F. Ryan has been appointed to the position of regional sales manager for the Midwestern region of **Kelite Corp.**, manufacturer of metal processing chemicals and other products. In addition to managing the sales region, he will coordinate the technical, internal control and marketing departments at Kelite's Chicago facility, where he is senior executive.

Gus Keulemans has been elected executive vice president of **The American Screw Co. Div. of Noma Lites, Inc.**

Robert G. Johnson has been promoted to coordinator of maintenance and expense reduction at **The Maytag Co.**

Charles E. Phayre has been named assistant manager of **Driver-Harris Co.** He worked in various sales and management capacities in the metal industry before joining D-H.

Howard A. Smith has been appointed sales training manager for **DeSoto Chemical Coatings, Inc.**

Fred J. Robinson has been named service manager of **American-Standard Industrial Div.**, Dearborn, Mich. He will direct service activities for the full line of the division's products.

James C. Laughrey has been appointed sales engineer by **The O. Hommel Co.**, Pittsburgh.

Stephen A. Furbacher has been elected vice president of **Kawneer Co.** He has been with the firm since 1948.

John J. Birdcell, formerly technical administrator of **P. R. Mallory and Co.**, has been named coordinating engineer of the **Copper Products Development Association**, New York City. In his new

TO PAGE 87 →



**"If you can't
stand the heat
—stay out
of the kitchen"**

**MEYERCORD
HEAT RESISTANT LINE
OF DECAL TRANSFERS**

H-R
Heat
Resistant

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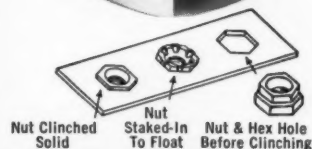
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For positive attaching of a threaded medium to thin metals. They are clinched solid for a rigid application, or staked in with a six point staking punch for a floating effect. Available with or without self-locking threads. Gripco Clinch Nuts can be clinched or staked with hydraulic or air equipment. Full details available—write for samples and NEW CATALOG today, or consult the yellow pages in your phone book under "GRIPCO" for the representative nearest you.



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Abson—a versatile acrylonitrile-butadiene-styrene material—becomes the newest addition to the growing line of quality plastic materials from BFG Chemical.

Abson has superior flow characteristics for molding and extruding—gives high gloss, excellent surface finish, and fine detail to finished products. You can count on its uniform high quality.

Production and application knowledge as well as samples are available. Write Dept. RE-2, B.F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Abson T.M. **ABS MATERIALS**

B. F. Goodrich Chemical Company
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GEON vinyls • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

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Personals

→ FROM PAGE 85

position, he will assist in research projects aimed to develop new uses for copper.

Erwin Bachrach has recently joined the sales engineering department of **J. O. Ross Engineering**, a division of Midland-Ross Corp.

He will specialize in paint finishing and special drying systems, and will headquarter in the Mt. Prospect, Ill. office of Ross.

Joseph H. Buerger, Jr., has been appointed director of sales of the **Crucible Steel Co. of America**. He will be responsible for all sales activities of the company and will direct field sales through five regional managers and 38 sales offices and warehouses.

Edward A. Koss has been appointed vice president-general manager of **Lux Clock Mfg. Co.'s** Lebanon, Tenn. plant, it has been announced by Arthur E. B. Tanner, president. Koss was formerly works manager of the Waterbury division.



BUERGER



KOSS

Michigan Oven Co. President Leroy M. Gill has announced three key appointments. **Graham G. Barton**, formerly Michigan sales representative for the firm, has been promoted to vice president. **Jerry E. Gibson** replaces Barton as engineering sales representative, and served most recently as chief estimator.

Gill also announced the appointment of the **Noble Equipment Co.**, LaGrange, Ohio, as the firm's sales representative in the Ohio area, with **C. E. Noble** in charge.

Anthony M. Cirelli has been appointed customer service manager by **Dollin Corp.**, producers of zinc and aluminum die castings. He recently served as lead inspector in the casting department.

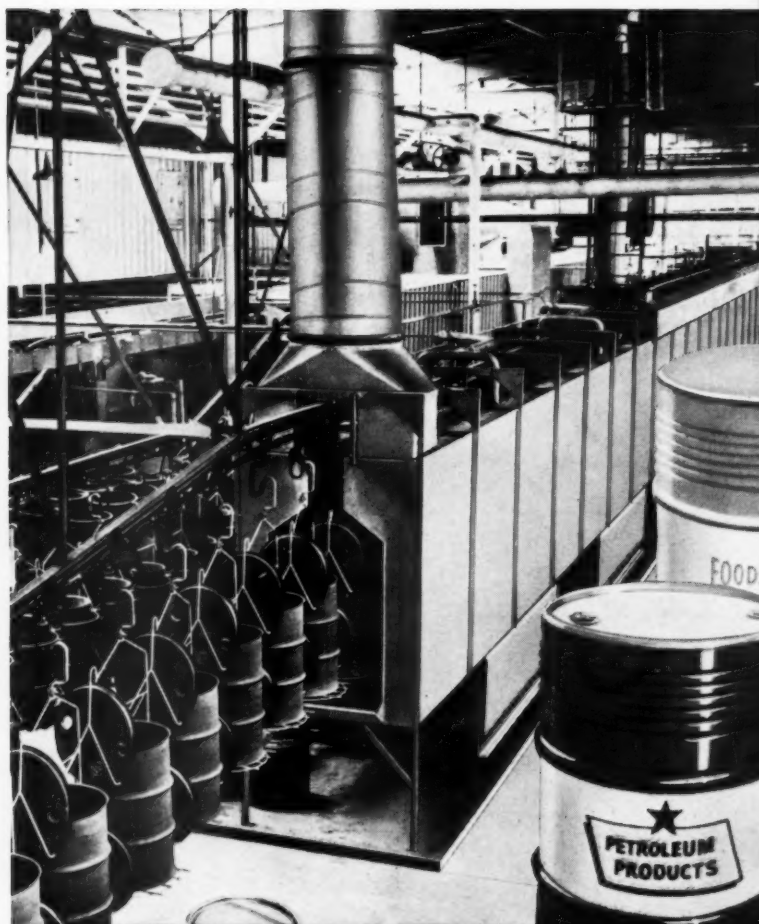
Geo. D. Roper Corp.'s board of directors has elected **Charles M. Hoover** to vice president and director of marketing, it has been announced by Roper President Richard S. Burke.

Free Standing, "Shove-In" or Built-In... PYRAMID engineered stainless steel trim can be yours with little or no tooling!

Pyramid Mouldings Inc.
 5365 WEST ARMSTRONG AVE., CHICAGO 46, ILL. — BRONXVILLE, NEW YORK
 WESTERN MOULDINGS INC., 1111 EAST 8TH STREET, UPLAND, CALIFORNIA

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Quality metal products deserve "the finishing touch" of Mahon



another example . . .
'maximum protection'
cargo drums from
top U. S. supplier

Mahon's metal cleaning and rust-inhibiting line installed at the Port Arthur, Texas, plant of a major supplier assures a "100% scale-free" product. Complete finishing is after fabrication to provide the best in cargo drums.

Mahon's Industrial Equipment Division knows production finishing best. If you make cosmetic cases or appliances, bicycles or railroad cars, or any other metal product . . . and if quality comes first . . . call in Mahon. Improved finishing can be the easiest and most economical product improvement you'll ever make. New paints, new methods broaden the possibilities. Find out what the 'finishing touch' of Mahon can do with your products . . . your costs . . . your sales. Get in 'touch' with Mahon.

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MAHON INDUSTRIAL EQUIPMENT

- Finishing Systems • Metal Cleaning Equipment • Painting Facilities—spray, dip and flo-coaters • Drying and Processing Ovens • Special Plant and Production Equipment



Beckman Instruments profits from NST program

BY *T. A. Dietrich* • CORPORATE PACKAGING ENGINEER
BECKMAN INSTRUMENTS, INC.

BECKMAN INSTRUMENTS, INC., Fullerton, Calif., is an electronics manufacturer producing more than 400 products ranging from tiny components to table-sized instruments to data processing systems weighing several tons.

Shipping this varied equipment, much of which has delicate electronic circuitry or other finely-balanced mechanisms, requires more than 100 standard packages. And, because many Beckman products are custom built, the company has a constant need for new and original packaging.

The company had relied almost entirely on test shipments for the final phase of its packaging program until becoming a member of the National Safe Transit Committee in February, 1959. Since then the company has participated in Safe Transit's control test program and has received certification for more than 25 packaged products. It is now routine procedure to seek certification for all packaged products when packages are being considered for standard use.

In a number of cases, control testing has influenced the design of an instru-

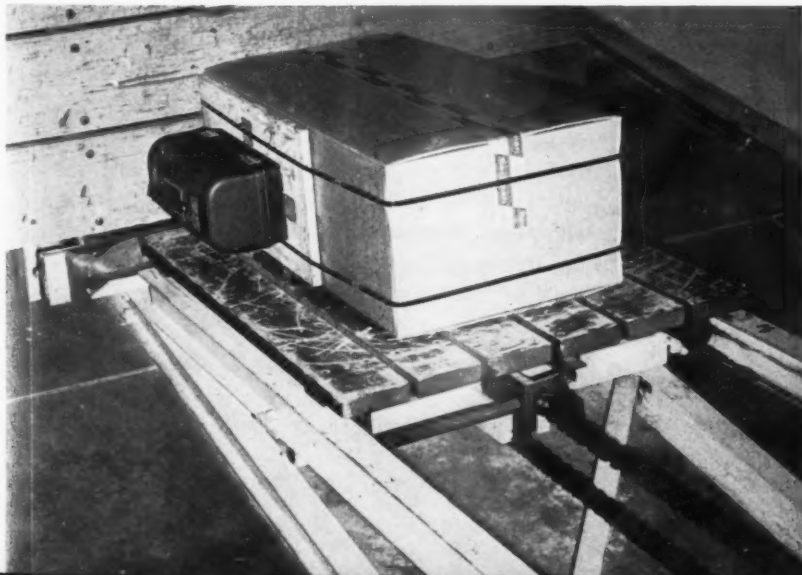
ment or its attachments. Company engineers have found, for example, that on certain instruments it is more practical to make design changes on mirror and transformer mountings, and similar items, than to "over-package" them for shipping.

The story of Beckman's participation in the Safe Transit Committee program is now being told in a 16-minute, color motion picture produced in-plant by the company's Corporate Product Standards Dept., which heads the packaging program.

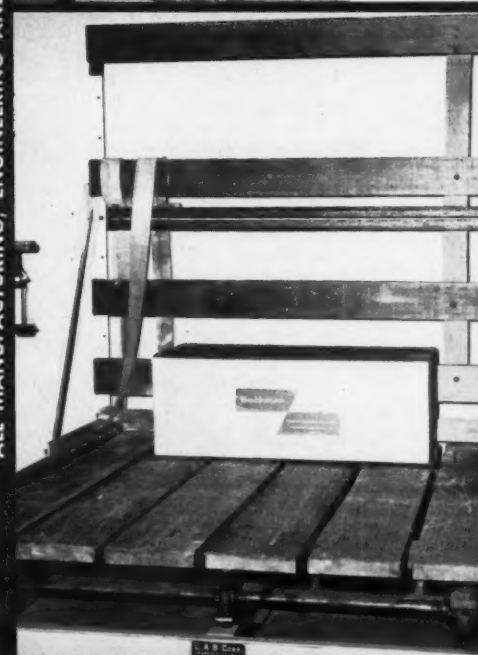
The movie covers every phase of the operation, from design to shipment, and is being shown to Beckman engineers and packaging personnel, field salesmen, dealers and some customers.

Also depicted in the film are the ways in which the certification program helps create profits by reducing packaging costs, shipping claims and insurance payments. More important, the film points out that packaging is the first link between the company and customer, and as such should be as high in quality as the equipment it protects. MPM

(Above, right) — Operator packs an ac-dc power supply unit for a DU Spectrophotometer in a shell of latex-coated bagasse. The material is shock absorbant and firm enough to hold the required weight. (Center) — A Zeromatic pH Meter is lowered into a corrugated box, final step before shipment. The instrument is mounted on a plywood base supported by four slotted polyethylene foam legs. The assembly is held down by folded corrugated inserts holding instrument accessories. (Below) — A package containing a Spectrophotometer begins a Conbur test at the Container Corporation of America testing facilities in Los Angeles. The equipment subjects a package to 10G impact load on all six faces. (Below, right) — The same package undergoing vibration tests which take only one hour to simulate conditions experienced in a 3,000-mile train or truck trip.



"ALL MANUFACTURING, ENGINEERING AND QUALITY EFFORTS ARE IN VAIN IF THE PRODUCT REACHES ITS DESTINATION IN A DAMAGED CONDITION."



edge protection for perforated
and other metals

thick film without
fill-in of pattern

color plus resistance
to chemicals and wear



New finish combination...pattern plus M&T Spray-on Vinyl protection

NOW YOU CAN SPRAY A VINYL COATING onto metal and produce a leather-like texture, or reproduce an existing metallic pattern in finest detail . . . thanks to new organosols developed by M&T. Equally important, your product gets all the heavy-duty protection that a *thick-film* vinyl finish provides against wear and corrosion.

You can choose your own color; in fact, you can *change* colors any time without obsoleting a large inventory of coated metal, as with laminates. Spraying permits application after fabricating operations, so scrap loss, seams and raw edges are

eliminated. Typical use: trim or overall finish on washers, dryers and other appliances.

M&T Spray-on Vinyls are up to ten times more abrasion-resistant than ordinary textured enamels. They are inert to caustics, acids, alcohols, oxidation, water, salt; unaffected by grease, perspiration, inks; immune to marring, chipping, peeling. Write for more information.



coatings and finishes

METAL & THERMIT CORPORATION
General Offices: Rahway, New Jersey

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COMING FEATURES

GENERAL

- ★ THE AUTOMATIC MERCHANDISING INDUSTRY ★
- ★ 4TH ANNUAL SPECIAL SECTION ★
- STANDARDIZATION — THIRD OF A SERIES
- OPERATION OF A 12-PLANT QUALITY CONTROL SYSTEM
- NEW ENGINEERING SERVICE FOR OEM

DESIGN

A NEW COMPACT GAS-FIRED BOILER

FABRICATION

REMOVING SOLDERING FLUX FROM STAINLESS STEEL
HOW KAISER REDUCED BATHTUB SCRAP

FINISHING

A SURVEY OF THERMOSETTING ACRYLIC PAINTS
PORCELAIN ENAMEL DECORATES
"THE AVENUE OF AMERICAS"
STRAIN GAUGES FOR EVALUATING STRESSES
IN PORCELAIN ENAMELED PRODUCTS

SHORT FEATURES

NEW HIGH-TEMPERATURE MATERIAL
NEW TECHNIQUE FOR HANDLING PALLETIZED LOADS
ELECTROSTATIC PAINTING: CASE HISTORIES



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The most versatile, long-life pilot light available...

add light to the life of your product!



LONG LIFE—usually outlasts the equipment on which it is used. Vibration proof, shock proof—gives thousands of peak operating hours. **STYLING**—every requirement covered with wide variety of lens colors and shapes, lens imprints, ring finishes, etc.; adds beauty to any product. **SIMPLIFIES PRODUCTION**—only 1/2-inch hole needed—mounts with push-on speed nut or snap-fits into your panel...and **SERVICE**—units made to your requirements, delivered to meet your production schedules...quantities from 1 to 1,000,000.

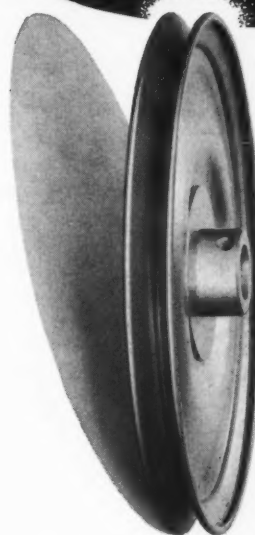
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EDGEWATER 13, NEW JERSEY

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- 2.4" to 12" PD for "A" and "B" Section V-Belts
- 1/2" to 1" Bore

Original equipment manufacturers whose products incorporate V-Belt Pulleys can make substantial production savings by obtaining them from Nagel-Chase. Specialists in the production of fractional HP pulleys, Nagel-Chase has the tools and production facilities for a wide variety of standard sizes. With this elimination of tool costs and the release of production facilities for other components, manufacturers find the use of Nagel-Chase pulleys cuts production costs.

Write for complete details and specifications

The NAGEL-CHASE MFG. CO.

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**Lead
makes
war on
spalling**

LOOK AHEAD WITH LEAD



PANEL COURTESY HAMLIN-STEVENSON, INC.

Lead's secret weapon: its ability to promote good bonding of porcelain enamel to aluminum at the necessary low firing temperatures. This stops spalling from spreading in a cut or damaged area on appliances, parts, and housings for industrial and consumer products.

Team up lead-frit porcelain enamel with aluminum's workability and lightness and you have a material that can be cut, sawed, sheared and drilled—right on the production line!

Finishes keep looking like new through years of service, despite exposure to heat, abrasive wear, detergents, mild alkalis and acids.

Lead helps porcelain enamel beautify as it protects. This results in colorfast finishes, tough and even.

Why not explore the possibilities of using lead in combination with the metals you work with? Write Lead Industries Association for your copy of *Lead in the Ceramic Industries*. Address: 292 Madison Avenue, New York 17, New York.

4485

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editorial voice of the national safe transit program

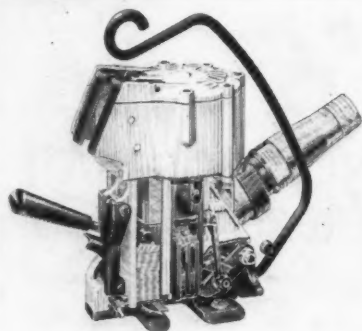
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DANA CHASE PUBLICATIONS, INC.

Devoted to improving packaging, shipping, and materials handling methods for the appliance and metal products manufacturing industries. This section contains information on plant experience and industry advances for improving packaging and shipping methods, and prevention of in-transit loss. It also contains information on the National Safe Transit Committee's preshipment testing program and reports on NST activities.

Portable, Combination Strapping Tool

The AMP, a portable all-power-operated combination strapping tool, has been announced by Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47, Ill.

Air power engages the feed wheel, tensions the strapping, applies the seal, severs the strap from the coil, and disengages the feed wheel. Developed especially for the unit is a new design of self-interlocking nested seal that simplifies



loading into the tool, and permits partial stacks to be loaded. Nibs in the flanges of the seal hold the stack together and in alignment until the seal is automatically fed into position on the strapping.

To complete a strapping cycle, the operator need only open the rear gripper and wipe in the bottom strap end, slide the top strap under the feed wheel, press the tension lever, then the sealer lever, and swing the tool free from the strapping.

Material Handling Course Announced

A special five-day course on material handling in the metal forming and finishing industry is scheduled to be held April 17-21, 1961 at the MHEDA National

Material Handling Center, Newport, R. I.

The course is designed primarily for intensive study by management personnel responsible for material handling in this industry. Seminars will be supported by visiting material handling engineers, project engineers and consultants.

An important objective of the course will be to explore many of the new cost-cutting ways to minimize and standardize the techniques within the industry. Registration will be limited to insure ample opportunity for group discussions of individual registrants' material handling problems.

For complete list of subjects, lectures, registration information, and other course details, contact Harry Freeman, Director, National Material Handling Center, 61 Narragansett Ave., Newport, R. I.

Release Date Change of Certified Products Register

William M. Wilkinson, secretary of the National Safe Transit Committee, Inc., 1145 Nineteenth St., N. W., Washington 6, D. C., has announced a policy change regarding the Certified Products Register. Beginning this year, only one printing of the CPR will be made, and it will be released on March 31 each year, instead of on January 1 as in the past. Quarterly supplements will continue to be made, and these will be published on the last day of June, September and December.

Carriers, dealers and distributors are always eager to know what products meet NSTC pre-shipment test standards. This fact alone has placed important emphasis on the desirability of the CPR as a reference material.

New entries and/or changes to be included in the new 1961 edition should be mailed to reach NSTC headquarters prior to June 15, 1961.

Handi-Truck Introduced

A new handtruck has been introduced by Southeastern Mfg., Inc., Waukesha, Wis. The truck features "roller conveyor



action," which allows the load to be more easily loaded and unloaded. Closer stacking of cartons and boxes is said to be possible with the new truck, as loads do not have to be shoved by hand after unloading.

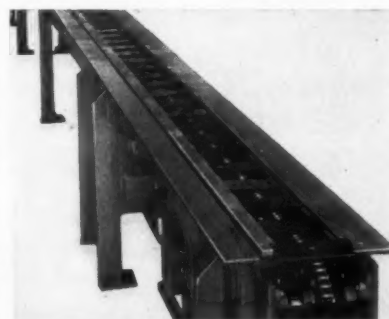
The entire truck is built of electrically welded steel tubing and is fitted with ball bearing wheels and rubber tires.

Indexing In-line Conveyors

Gaynes Engineering Co., 1646 W. Fulton St., Chicago, Ill., is now manufacturing indexing in-line conveyors of unusual flexibility, capacity and length. Power and length of index can be varied to suit any demand condition. Indexing movements of 100 per minute have been achieved, and strokes of any length are possible. These conditions are met with tolerances of .002. The bed and platens can be made to suit any structural requirements.

This type of conveyor is said to be ideally suited to automation or packaging layouts. Operating stations can be mounted on the frame, which can accommodate work stations of any size or position.

Engineering service for a complete automation line is available from the firm.



SPRAY CLEAN AND PHOSPHATIZE

ferrous metals in one operation
with new **DIVERFOS F-72**

DIVERFOS F-72
conforms to
**U.S. MILITARY
SPECIFICATION
MIL-C-490A**
Grade III process

Phosphatizing in many plants is a needlessly complicated procedure. Three, four or more stage processes are often used when a simple two stage process using Diverfos F-72 is all that's needed. The exceptional detergent action completely removes most soils; leaves surfaces with a uniform, tightly bonded iron-phosphate coating. Complete cleaning reduces spotting and uneven coating to a minimum and eliminates the need for additional coating steps. Want expert advice and guidance to insure desired phosphatizing results? Call your local Diversey D-Man. For literature write THE DIVERSEY CORPORATION, Chicago, Illinois.

Soak or spray, you get superior ZINC-PHOSPHATE coatings on iron or steel with DIVERFOS Z-1

You know you get better corrosion resistance and tighter adhesion because Diverfos Z-1 meets and exceeds Federal specifications. Uniformly heavy crystalline coating conforms to Specification MIL-C-490A, Grade 1 process. Diverfos Z-1 baths are exceptionally long-lived (a real winner with cost conscious production people). For unusual sludge problems, specially formulated Diverfos A-1 additive prevents sludge and assures consistently uniform zinc-phosphate coatings. Your Diversey D-Man can recommend the most economical phosphate coating process for your plant. For literature write THE DIVERSEY CORPORATION, Chicago, Ill.

DIVERFOS Z-1
conforms to
**U.S. MILITARY
SPECIFICATION
MIL-C-490A**
Grade I process

DIVERSEY



DIVERFOS F-72

Circle No. 313 on Reader Service Card.

METAL PRODUCTS STATISTICS

	1961 (Units)	1960 (Units)	% Change
Gas Furnaces.....Jan.	59,200	59,700	- 0.8
Gas Boilers.....Jan.	8,931	6,821	+30.9
Gas Conversion Burners.....Jan.	6,400	7,100	- 9.9
Oil-Fired Central Heating Equipment.....Jan.	41,309	46,113	- 10.4
Gas Ranges, Free-Standing.....Jan.	91,600	110,900	- 17.4
Gas Ranges, Built-In.....Jan.	20,200	22,600	- 10.6
Gas Water Heaters.....Jan.	227,000	215,500	+ 5.3
Gas Vented Recessed Wall Heaters.....Jan.	26,800	26,700	+ 0.4
Gas Floor Furnaces.....Jan.	4,500	3,700	+21.6
Gas Direct Heating Equipment.....Jan.	38,400	41,500	- 7.5
Gas Unit Heaters & Duct Furnaces.....Jan.	12,100	12,800	- 5.5
Gas Incinerators.....Jan.	3,600	3,300	+ 9.1
Electric Household Refrigerators.....Jan.	225,700	266,700	- 15.4
Electric Farm & Home Freezers.....Jan.	58,100	53,200	+ 9.2
Electric Ranges, Free-Standing.....Jan.	71,100	68,900	+ 3.2
Electric Ranges, Built-In.....Jan.	38,300	46,100	- 16.9
Electric Water Heaters.....Jan.	52,500	48,700	+ 7.8
Electric Dishwashers.....Jan.	40,800	37,200	+ 9.7
Electric Food Waste Disposers.....Jan.	55,900	51,800	+ 7.9
Combination Washer-Dryers.....Jan.	6,383	13,964	- 54.0
Washers—Automatic & Semi.....Jan.	187,052	202,943	- 8.0
Washers—Wringer & All Other.....Jan.	41,867	51,622	- 19.0
Electric Dryers.....Jan.	66,190	74,177	- 11.0
Gas Dryers.....Jan.	36,968	37,426	- 1.0
Vacuum Cleaners.....Jan.	242,515	258,330	- 6.1
Metal Furniture.....Jan.		*	- 16.0
Typewriters.....Jan.-Dec.		1,190,896	
Steel Barrels & Drums.....Jan.-Dec.		30,592,018	
Steel Pails.....Jan.-Dec.		71,692,119	
Room Air Conditioners.....Jan.	96,200	*	*

* Not reported

Sources for this information: Gas Appliance Manufacturers Association, National Electrical Manufacturers Association, American Home Laundry Manufacturers Association, Vacuum Cleaner Manufacturers Association, National Association of Furniture Manufacturers, Electronic Industries Association, Air-Conditioning and Refrigeration Institute, and U.S. Dept. of Commerce.

To sell
to
manufacturers
of

VENDING MACHINES

M Measure the
P Market!
M Pinpoint the
Prospects!
M Make sure
of Impact!

For over 8 years, MPM has provided manufacturers of coin-operated vending machines with specialized, authoritative reporting of the field. A special section devoted exclusively to this OEM market is published each year.

MPM's editors have contacted every manufacturer of automatic merchandising equipment, have counselled with the industry's national association, and have gone into the field to secure feature material.

This editorial emphasis perfectly complements MPM's depth of coverage. MPM reaches key men in every plant in the U.S. engaged in producing vending machines—men in top management, purchasing, design, engineering, and key plant management and supervision.

A consistent program in MPM will guarantee your client exposure among the 150 companies principally engaged in producing automatic merchandising equipment—and among those companies like Westinghouse and Geo. D. Roper which, while principally engaged in appliance production, also produce coin operated equipment.



For more facts and information on the vending machine market, or for a copy of MPM's 1960 section on the automatic merchandising industry, write, wire or phone...

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KARL J. SHULL, 608 Midvale, Los Angeles 24, Calif.GRanite 7-8824 and WEbster 1-3030	
RUSSELL W. MADDOX, 235 Hippodrome Bldg., Cleveland 15, OhioSuperior 1-2062	
WILLIAM S. HAYES, 17 E. 48th St., New York 17, N. Y.PLaza 2-3764	

Kaiser coats coil

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before entering the 100-foot bake oven. The gas-fired oven has independent heating equipment and temperature controls for each of the three zones. Air velocities within each zone are adjustable by means of a series of adjustable cross slots, plus volume control dampers at the recirculation and air makeup connections.

Following baking, the strip passes through a water rinse and is dried by guiding squeeze rolls. Next is the exit drive bridle, a second accumulator, an exit roll stand, and a shear for removal of the spliced section. Finally, a pair of rolls direct the strip into the rewind stand.

Completed coils are removed by transfer car and placed on skids for removal to shipping areas.

New supplies

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Turntable Positioning Machine



A positioning machine, designated Model PM-1051, manufactured by Boesch Mfg. Co., provides a rugged motor driven turntable on which weldments and other assemblies may be mounted for precise positioning and rotation during welding or fabricating operations.

Assemblies weighing up to 2000 lbs may be mounted on the 32-inch diameter flat machined faceplate and secured to milled T-slots. Pre-selected angular positioning of the table from vertical to 15° beyond the horizontal is automatically achieved by simple adjustment.

Circle No. 216 on Reader Service Card.

Vinyl-To-Metal Adhesives

A complete line of adhesives for vinyl-to-metal laminations has been announced by National Starch and Chemical Corp. Trade-named Vy-Metal Adhesives, the group bonds vinyl films that simulate leather, textiles, wood grains and marble to steel, aluminum and magnesium metals. Applications include card-table tops, luggage, typewriter cases, TV cabinets, elevator doors, etc.

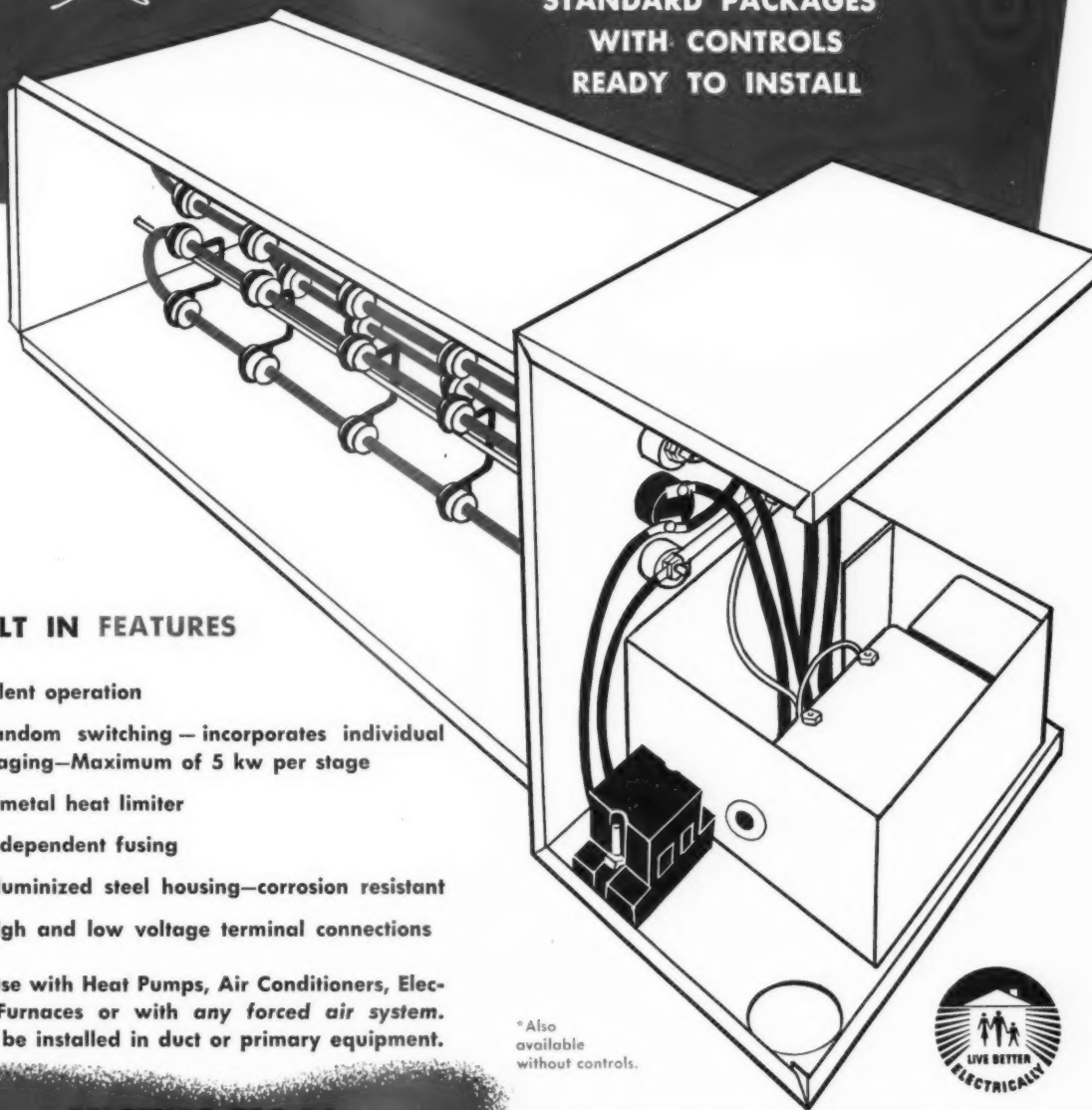
The line includes four types: a curing adhesive; a thermoplastic adhesive; a heat resistant adhesive; and a thermosetting adhesive.

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Additive Dispenser



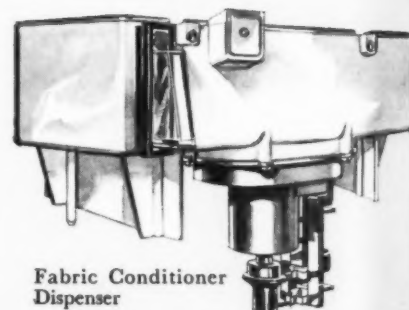
D-4 Clotheswasher
Dispenser

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It's the *exclusive* features you design into your product that clinch the sale for *your* appliance over all others. One of the simplest, yet most exciting, components you can add is a Dole additive dispenser. Exciting, because you're providing the sales group with a dramatic and functional built-in or add-on that gives them a competitive edge. Simple, because you can turn the entire design project over to Dole's complete staff of experienced control application engineers for a practical, saleable solution.

Dole engineers will implement your basic ideas while the design is still on the drawing board, will provide a functional solution to your problem—a complete system, or essential components—and will come up with a prototype that will meet the most exacting specifications for quality. Then, Dole's manufacturing know-how will produce your custom-designed product exclusive in mass quantity while maintaining pilot model standards.

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